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A Revolution in Machinery Design

Affecting Industrial Machinery Particularly, It Represents a Breaking with Tradition and Is Economic Rather Than Technical

BY WALTER STUART KELLEY*

OUR industrial age is by no means past; in fact, it appears about to take a new lease of life because of epochal changes that can now be forecast. The industrial characteristics of the nineteenth century, however, are beginning to be less evident as factors in shaping social development. Evidence is apparent that economic values are shifting, that a new appraisal is close at hand. New factors are shaping that will accentuate and hasten the action of present tendencies toward low cost production and its invariable concomitant, higher wages.

Since time immemorial, power, whether it was ox-power, horse-power, water-power, steam-power, or the first of all, man-power, has been used to make machinery productive. Note clearly this fact: it is power that makes a machine productive, regardless of whether it be humanly directed, or automatic in its operation. The machine itself is powerless to produce. This point is emphasized as it affords a clue to what follows.

It has been necessary in the past to apply power in a stereotyped manner, after a certain inescapable fashion. Because of this fact and the handicaps inseparable from it, machines as now built will in retrospect appear clumsy and inefficient, therefore expensive to build and to operate. To overcome the mechanical handicaps so far as humanly possible has been the province of the designer and the inventor.

Two considerations, one objective and one subjective, have determined the type, or character, mechanically of any machine, of every machine. The latter has not changed, it has been invariable since machinery, as we now know it in industry, was first made. This was because of a fixed, inescapable condition, that is, the character of the

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Electricity Will Be Responsible for This Century's Advancement

TO orient to readers the sweeping character which he ascribes to the new epoch in machinery construction, Mr. Kelley contributed the following historic background:

Industry, defined as "productive labor employed in any manufacture," dates from the improvement of the steam engine by Watt in the latter part of the eighteenth century. Then for the first time power could be developed anywhere that fuel was available. With increasing industrial development water power likewise began to assume prominence. With advancing civilization the domestic manufacture of commodities became insufficient, and with the advent of the steam engine factories sprang up in populous centers. The spinning wheel gave place to the "spinning jenny," and that in turn to the "spinning mule"; the hand loom to the power loom, and the machine shop appeared to supplement the work of the blacksmith and the foundry.

Early in the nineteenth century the necessity for transportation for the increasing output of factory products brought the steam locomotive into being, and railroad construction went steadily forward despite opposition to it as "a device of satan."

In the case of each of these twin agents of civilization, transportation and manufactures, the steam engine was and still is the dominant factor; it is, however, one of those things to which reference was made at the outset whose influence is beginning to wane. Steam controlled and put to work was mainly responsible for the remarkable industrial development of the nineteenth century. Electricity controlled and put to work in a multitude of ways will be responsible for what will prove a more remarkable economic development and a much greater advance in civilization.

power, that made it necessary to apply it at a definite point, with a definite movement as to direction and speed.

Factors in Initiating Design

AS to the first of the two considerations: A person is given the task of designing a machine that will take in material of a certain sort and deliver a certain definite product. The one machine may take in raw material and deliver a finished product, as the machine that receives paper from a roll and turns out an envelope, gummed, folded and stamped, and printed with return card; or a monster printing press that is also fed paper from a roll and turns out a newspaper, printed, folded and counted, at an almost incredible speed. Or the machine, as is more usually the case, may be one of a series, each performing a certain process, as with textile machinery. In the manufacture of ordinary cotton cloth the material passes through 18 machines from the raw baled cotton to the bale of cloth, each machine representing a separate and distinct process.

In starting out to design any machine it is essential for the designer to know

(a) The material to be worked, its character and texture;

(b) Its condition and the form in which it enters the machine;

(c) The condition and shape in which it must be delivered;

(d) The weight or mass of material to be worked while passing; and finally,

(e) The rate of production, which fixes the speed of different parts of the machine.

Before putting pencil to paper the designer must study the problem from A to Z, must make a mental estimate of the different movements and changes of motion, the number of parts, their general shape and size. In assembling these into a connected whole the machine takes form in his mind's eye.

When his mental picture has taken on a definite shape, he takes up his pencil and makes a free-hand sketch, usually several before one is satisfactory; then with this as a starting point he begins a more particular sketch, in which each feature takes its proper position, with some attention given to proportion; at this point the separate design of each is begun. In drawing details to scale, determining the number of parts, the shape, size, strength, movement and speed of each part, the designer continually meets the same handicaps, change of speed or direction of rotation, or character of motion.

With the details of each part settled the machine as a whole is drawn to scale, but not infrequently there results an impossible combination and the design must be revised.

Inhibitions in Providing for Power

AS to the second consideration: Heretofore, in working out the details of any machine, the designer has repeatedly been obliged to devise means to overcome the inescapable condition that power and motion came from a single source. Therefore, it must be initially applied at a single point (except in rare situations) and at a fixed speed. The power, usually with rotary motion, may be applied to the machine by means of a belt, chain, gear or shaft. Within the machine it may be necessary to vary the speed at several points, to change motion from rotary to rectilinear, to provide reciprocal motion, to provide rotary motion with varying angular velocity, etc., and the designer has been obliged to devise mechanical (and sometimes clumsy) means to obtain all these various movements so that each functions positively and in order from the single movement initially applied.

In designing and constructing a new machine of an original type, a manufacturer must start with a long purse, for the expense of the completed machine not infrequently runs into six figures, occasionally into seven. The designing may take months of an expensive force; much research may be required. Then it may be found necessary to rebuild the first one finished. Then comes experimental operation, which may develop the necessity for additional redesign. Sometimes the whole machine has to be scrapped and a new start made.

With the machine perfected and the machine builder's worries over, the purchaser and user begins to have his; first, the machine represents a large investment; second, mechanical complications require expert attention; third, maintenance cost is high; fourth, in the light of present possibilities use of power is inefficient; and fifth, possibly large space is occupied. These conditions spell high cost of product.

Mental Bondage to Established Custom

The adverse conditions enumerated for both builder and user of the machine are due in large part to consideration No. 2, that has rigorously prevailed until lately; yet even to date very little advantage has been taken of the greater technical freedom in machine design, increasingly possible. Mental bondage to established custom has so far proved stronger than technical freedom of action.

The real badness of the mechanical complication heretofore made necessary by the inhibitions imposed by that one fundamental condition (consideration No. 2, the method of applying power and motion) has never been properly sensed, even by the machine builder. There has, till recently, been no other way, so the conditions have been accepted as inevitable and little thought given to them or much said about it.

But the time has arrived when the designer of machinery is in reality emancipated (if he will be) from the necessity of applying power at one point, and motion likewise, of a single character and speed. Will he accept emancipation? He appears to be very slow in doing so. The inexorable character of former conditions governing the application of power and motion to a machine has so powerful a hold—mental attitude with regard to it has become so fixed—that mechanical designers find it difficult to escape its thraldom. Only occasionally will one become so emancipated as to be fully and freely motivated by the—to him—new idea.

Another reason for slow acceptance of the new freedom is that mechanical designers have rarely had any considerable electrical experience. They are more or less in awe of the intricacies of electrical design and so fight shy of it. When of late there has been indicated a close combination of machine and electric drive, the mechanician has used a standard motor, or the electrical feature has been left to the electrical manufacturer.

Since electric motors became a factor to be reckoned with in applications of power some 30 years ago, electrical and mechanical designers have followed parallel though, as a rule, quite distinct courses. Whenever electric drive seemed to be indicated as a more desirable motive power, the electric motor has been used by the mechanical designer, but he has applied this form of power precisely as he would have done power directly from an engine or a water wheel. He has not sensed the basic fact that electric power (the phrase is a misnomer) is not power at all, just a means of transmitting power, the most convenient, serviceable, flexible and controllable in existence.

Electric Motor No Longer an Adjunct

Here now is the great idea. It is possible by the means electricity offers to apply directly at one or several points, without the intervention of mechanical means, rotative movement of 10,000 hp. or 0.001 hp. through a wide choice of speed; also rectilinear motion through a wide range.

And by simple mechanical aids these two basic movements can be varied to obtain other characteristic movements, reciprocating, varying angular velocity, etc.

Although not formulating the present freedom in design till quite recently, the extended experience of the writer in both mechanical and electrical design, made it quite natural to combine the results of such experience more intimately than others have done and then to sense the real situation.

The design of electrical forms and movements is no longer a closed book to all but a few; they are almost as much common property of technicians as the particular features of mechanical design. There is therefore little of a technical character to prevent manufacturers of machinery from combining electrical with mechanical production.

Very distinct changes in method, however, will take place. These are likely to be more complete than is at once apparent. This revolution in manufacturing methods will not come in a day, or a year, but should be much in evidence in ten years. The limiting factor as to time will be the supply of competent designers available.

There are two wise sayings that will throw light on this situation.

"How use doth breed a habit in a man,"

and,

"Habit with him was all the test of truth;
It must be right. I've done it from my youth."

This is the point of view that—with rare exceptions—prevails with experienced technicians. It is because of mental attitude that a mechanical engineer, or master mechanic, is rarely competent to organize the most efficient electric drive, where it is only a question of placing electric motors. This is not an evidence of any lack of ability in his line; it is a matter of mental attitude. He is simply unable properly to interpret a concept of power transmission, not merely different from, but actually at variance with, his regular line of thought. Therefore, there must be time for the demand for electro-mechanicians to develop a new crop of engineers. The only other supply is from the few who have not become rutted in the traditions, precedents and methods of either electrical or mechanical design, per se.

[In a following article the author proposes to be more specific regarding the implications herein set forth, with an attempt to supply suggestions of practical interest to machinery builders.]

Pittsburgh Bridge Selected as Most Beautiful Built in 1928

THE most beautiful steel bridge completed during 1928 is the Sixth Street bridge over the Allegheny River in Pittsburgh, according to a jury of awards appointed by the American Institute of Steel Construction.

This bridge was designed by the Bureau of Bridges, Department of Public Works, Pittsburgh, under the supervision of V. R. Covell, chief engineer. It was constructed by the American Bridge Co. and the Foundation Co.

The structure is of the self-anchored suspension type and is 884 ft. long, having a roadway 37 ft. 6 in. wide between curbs in addition to two cantilever sidewalks.

A jury of five made the selection. Two of the jury were named by the American Institute of Architects, two by the American Society of Civil Engineers and one by the American Institute of Steel Construction. This jury was made up as follows:

George H. Pegram, past president of the American Society of Civil Engineers, chief engineer Interborough Rapid Transit Co., New York.

William A. Delano, fellow of the American Institute of Architects, and member of the firm of Delano & Aldrich.

Ralph T. Walker, member of the American Institute of Architects, and member of the New York firm of Voorhees, Gmelin & Walker.

Charles Evan Fowler, member of the American Society of Civil Engineers, consulting engineer, New York.

Dr. J. Horace McFarland, president of the Art Commission of Pennsylvania, Harrisburg, Pa.

It is the intention of the American Institute of Steel Construction to decorate this bridge with a suitable bronze tablet, and certificates containing a reproduction of this tablet and the names of those interested in the construction of the bridge will be awarded. Plans for the ceremonies incident thereto will be discussed at the annual meeting of the institute at Biloxi, Miss., Nov. 12 to 16.

Other bridges came in for honorable mention, among them the High Bridge over the Harlem River in New York, the Cottage Farm bridge over the Charles River in Boston and the Thirty-first Street bridge over the Allegheny River in Pittsburgh.

Thermit Welding and the Steel Mill

Superheated, Gas-Free Steel Carrying a Little Aluminum Solidifies Into Metal Tough as a Forging—Proper Procedure Necessary for Success

BY J. H. DEPPELER

ASIDE from a series of illustrations of repair work done by the well-known thermit process (such as building up worn wabblers, welding breaks in heavy axles, crankshafts, frames, cylinders and bed plates) Mr. Deppeler's paper consisted of a discussion of the nature of the metal in the joint. From this portion the following is abstracted.

In considering the physical quality of thermit steel, the first question is, will not the strength of the welded part be only that of a similar cast steel part and not that of the original forging? As a matter of fact, forgings that have been thermit welded and tested to destruction will just as often fail completely outside of the welded area as they will in the weld or in the metal adjacent to the weld.

Steel, as cast, differs from forged or worked steel not in its chemical composition but only physically. Commercial cast steel on solidifying throws to the grain boundaries many impurities, and these, forming part of the cementing medium between the grains, are weaker than the grains themselves so that fractures of cast steel are usually intergranular. Forging, rolling, or working of these grains distorts them, so that the strength of the piece is then that of the material itself and not of the weaker grain boundary.

Weld Metal Quite Different from Cast Steel

Thermit steels, instead of being a refinement of relatively impure materials, are the result of the reduction of pure iron oxide by pure aluminum, with the result that they, although cast, invariably fracture through the grains.

From a paper read at the annual fall meeting of the American Iron and Steel Institute, New York, Oct. 25.

AFTER being graduated from the Stevens Institute of Technology in 1906 with the degree of mechanical engineer, J. H. Deppeler was associated with the New York Central Railroad in the electrification of its New York terminal. In 1909 he became interested in acetylene welding and worked in the research and development of this until 1912, when he became associated with the Goldschmidt Thermit Co., now the Metal & Thermit Corporation, New York. He is now chief engineer and works manager of that company.

This question was thoroughly investigated during the war, when Lloyds' Register of Shipping was asked to approve the use of stern frames made by welding together several simple forgings. Cast steel frames had been approved, but this request was refused on the consideration that, if a customer was willing to pay the extra cost of a forged steel frame, it would not be right to furnish him a forged steel frame with cast steel welds, because this would be no stronger than a cheaper cast steel frame of similar design. This contention started a series of tests on 10 x 10 in. sections of forged steel approved by Lloyds, some of the welds being between sections with free ends and others between sections not free to move. The results of this test are available in detail to anyone who may desire them, and resulted in Lloyds' approval of the thermit welding of forged steel frames.

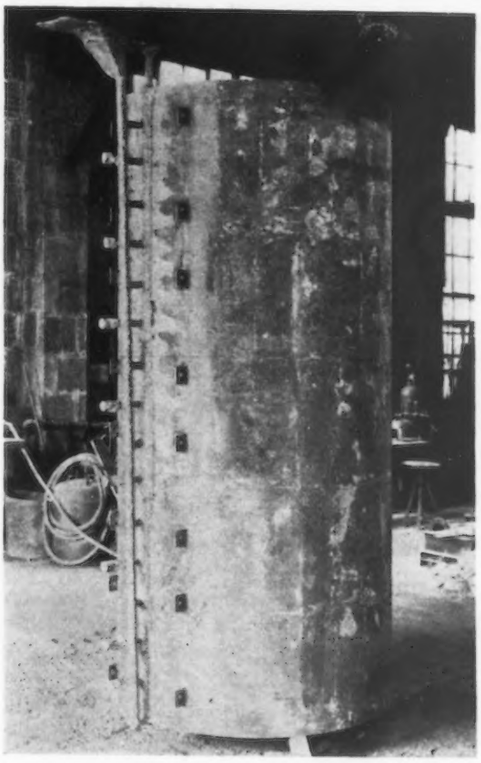
One impact test was quoted; where a 10 x 10 in. billet welded at the center and supported on 5-ft. centers was struck by a tup weighing 3290 lb. falling nine times from a height of 18 ft. This resulted in a permanent bend of 1¼ in. but no sign of fracture. The specimen was then turned over and straightened out by continuing the blows.

After this, Lloyds' engineer suggested that the weld be sectioned and examined internally rather than to continue the impact testing, which might be prolonged.

Since the approval of Lloyds' Register of Shipping and by the American Bureau of Shipping hundreds of stern frames of steamers have been thermit welded and, although in one or two cases these frames have again broken, the breaks have never been closer than 3 ft. from the weld. This, of course, is not a true test of the comparative strength of thermit steel and forged steels, because in the case of these ship welds the excess metal at the weld is usually not machined off; but it is indicative of the fact that the metal next to the weld is not harmed to any appreciable extent by re-crystallization or otherwise.

All the common alloying elements are easily reduced from their oxides by powdered aluminum, and these reductions have been carefully studied to determine the efficiency of the reactions. By properly mixing of the various thermits it is therefore possible to produce a steel of a given analysis. By such means, we have at our control the tensile strength, the ductility, and the hardness of the resulting steels. The tensile strength can be varied from about 50,000 lb. per sq. in. to 110,000 lb. per sq. in., and the corresponding ductility from over 40 per cent elongation in 2 in. down to zero.

Those familiar with the casting of ordinary steels must realize the difficulties we encounter at the extremely high temperatures so necessary for the welding operation. Thermit steels, however, have one very great advantage: they are perfectly deoxidized. In fact, all



LONG Seam in 2-in. Boiler Plate. Ordinarily such a long thin seam would be uneconomical because the volume of metal in the gates and risers is such a large proportion of the whole, but in heavy drums the advantage of simultaneously welding the entire seam and thus minimizing the internal thermal strains is obvious

of them show a very slight aluminum content. Here again, the steel man is suspicious, because an excess of aluminum to him usually means trouble, but the troubles that he has experienced are due more to entrapped particles of alumina rather than metallic aluminum alloyed with the iron. Even though, in the thermit reaction, great quantities of alumina are formed, the heavy metal is as liquid as water and separates from the lighter slag completely and almost instantaneously.

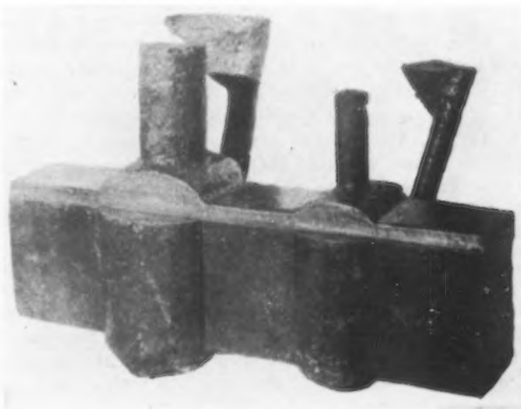
For these reasons, thermit steels do not have to be poured at low temperatures to cause them to solidify into dense, sound castings, and the presence or absence of defects in the steels will depend entirely upon the mold itself and the material from which it is made. To avoid contamination from the latter, it is necessary to select the best silica sands and clays and make a synthetic molding material containing a minimum of clay so thoroughly mulled with the sand grains as to coat each grain with the thinnest possible layer of clay. Such a molding material not only generates much less gas when the thermit steel comes in contact with it, but also remains so porous that the little gas generated easily passes out through the walls of the mold and not through the liquid steel. Loose grains of sand trapped in the superheated steel will completely volatilize.

The elimination of defects was aided by a condition inherent in thermit welding, that is, that the weld solidifies from the inside toward the outside; this, of course, tends to promote density and soundness in the weld itself. Before this fact was thoroughly realized, it was customary to use large risers, which were not only wasteful but actually harmful. It must be obvious why this shrinkage is so different from that in ordinary foundry practice; in the foundry, the heat from the molten steel passes out slowly through the mold, and solidification of the casting occurs first on the surface in contact with the mold and progresses toward the core of the casting, whereas in the welding operation the parts being welded act as enormous chills in the casting and extract the heat of the molten steel more rapidly from the center or core than from any other point. Freezing, therefore, occurs first approximately along the axis of the parts. The realization of this fact introduced a radical change in the design of welds, which fortunately at the same time greatly lowered the cost of the welding operation. This decrease in cost in turn has increased the applications of welding until now it is more economical to weld almost anything in the steel mill than to substitute a new part.

Four Precautions Necessary in Practice

Describing his experiences with thermit welding for steel mill repairs, L. F. Coffin, mechanical engineer, Bethlehem Steel Corporation, Sparrows Point, Md., noted four vital factors for success, viz., the set up, mold ramming, preheating, and release of the parts after welding. Since many repairs are not simple butt welds, but occur in irregular sections partially or wholly fixed by surrounding metal, the design of proper clamps and the provision of proper movement consistent with changing temperature are most important. Each repair merits close study of its individual peculiarities. Sometimes the supports or clamps may be mounted on rollers; at other times the parts must be initially jacked apart, and the jacks gradually released on cooling. Thermit welding of hollow cylinders also requires the best molder's skill to make a satisfactory core. For this and other reasons, Mr. Coffin prefers to do the thermit welding in the steel foundry. Lack of adequate preheating spoils more welds than any other cause. The joint should be uniformly and deeply heated to a high temperature with a reducing flame. Cooling after welding should be under control. In most cases a full annealing will be justified to reduce internal thermal strains. Annealing also increases machineability, although the speaker advocated leaving all excess metal in place as an extra factor of safety, wherever clearances would permit.

David Arnott, chief surveyor, American Bureau of



COMPARISON of the Amounts of Thermit Used in the Old and in the New Practice. This reduction greatly lowered the cost of the welding operation, but the reason for it was primarily the improvement of the internal quality of the weld

Shipping, New York, defended the marine authorities for being so cautious in approving new methods of construction or repair. A failure at sea is much more fraught with danger of great monetary and human loss than one on shore. Tests made 10 years ago and cited by Mr. Deppeler are unable to explain certain recent failures. For instance, if a stern frame breaks and is repaired, why should it fail again? In one instance a new forging replaced a part which broke away and was lost; the second fracture occurred in this new metal. In his opinion, the paramount consideration is the procedure in making the weld; there should be complete freedom for the parts to move during the temperature changes so as to reduce internal strains to the minimum. Control of such residual contraction stresses is, in Mr. Arnott's opinion, the most important problem now before those who are repairing ship frames and other massive parts by thermit welding.

Improper design of the part is sometimes responsible for original fracture, in the opinion of J. W. Owens, welding supervisor, Newport News Shipbuilding & Dry Dock Co., Newport News, Va. In such cases a second fracture may be expected, since obviously a repair by welding does not cure the fundamental defect. He had found one fracture of a stern frame immediately alongside a weld, but ascribed this to a concentration of stress caused by a heavy collar of weld metal around a relatively small cross section.

Small Shops Need a Superintendent

This Official Would Relieve Pressure on Manager and Foreman and Increase Production Efficiency

BY ARTHUR MUMPER*

THE general run of machine and die jobbing shops would gain much in efficiency if sound principles of industrial management were adopted. Too many of them are operated in a haphazard fashion. The business is transacted by an owner-manager, a shop foreman and a man in the office who is a combination bookkeeper, stenographer and time-keeper.

The owner-manager, of course, is the head of the company and usually does the work of three or four men. He makes all important 'phone calls, dictates answers to letters that require his attention, reads a large number of letters that are laid on his desk by a too-hurried office girl or man, quotes on a considerable amount of pending work, makes hurried business calls to various parts of the city by automobile, looks over requisitions for material and supplies, sees salesmen, goes out after new contracts and checks up on shop activities of the previous day and on work in process. Since the owner-manager in most cases is a former mechanic, he generally fills in his spare time by trying to help an over-burdened foreman.

So far as salaries go, the owner-manager of a jobbing shop employing an average of 30 men should rank fairly high, for he conducts a business amounting to about $125,000 annually. During an exceptionally good year, such as the shops in Cleveland enjoyed in the year ended last August, the annual business may go as high as $180,000. Thus, it would seem that the manager of such an establishment is too valuable a man to attend to any but strictly executive duties, leaving the lesser activities to someone else.

The foreman, on the other hand, is overburdened also. He must quote prices and deliveries on new work, make out material requisitions for various jobs, do considerable designing, plan the program for his 30 men, see that the material and blueprints are got together at the proper place and are so arranged that any one man or any number of men finishing a job at one time can turn to something else without delay; he must give his men individual attention as they need it, plan his work for the night turn, see that the men understand the blueprints thoroughly, take up with the inspector mistakes made in the shop and help decide what is to be done about them, and assume as many of the details as possible so as to relieve the manager. It is not surprising that, with these duties to look after, the foreman has no time for reflection or for studying his plant with an eye to improvements.

There should be provision for an assistant foreman, but the management seldom wants to pay enough for this job to make it attractive, in view of the great amount of detail involved. A good tool maker can earn about as much money on the bench without any responsibilities except those in connection with his own work.

To relieve the pressure upon the manager and the foreman there should be a superintendent, who ranks between the manager and the foreman. His duties should include quoting on prospective business, ordering materials, supervising the work of the designer in laying out his work, going over the shop inspector's reports and making decisions in regard to mistakes. He also should act as a buffer between the manager and the foreman, settle all matters that do not demand the manager's personal attention, interview all salesmen, see that no one gets in to the manager whose business he can handle, direct the activities of the office force, decide the precedence of orders in the shop and choose the materials to be used when they are not specified on the customer's blueprints.

If this plan were followed, the inspector would not be responsible to the foreman, but to the superintendent. However, he would work in close cooperation with the foreman. The designer, who would report to the superintendent, would do all drafting, thus relieving the manager and foreman of this job.

Many benefits would result from the operation of such a system. No longer being bothered with details that formerly required about 30 per cent of his time, the foreman could give efficient supervision to shop activities, a job that should be his first duty. Production would be increased, scrap losses would be reduced, savings would come from reclaiming waste matter and the mental and physical strain on the manager would be lessened. It is not an exaggeration to say that the superintendent, if he measured up to the proper standard, would earn his salary many times in increased efficiency throughout the entire personnel, from the manager down through the ranks.

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Solid Tests of Open-Hearth Slags

Condition and Composition of the Bath Judged by Color, Shape and Other Characteristics of Solid Slag

BY E. J. JANITZKY

IN the making of basic open-hearth steel, process control, as exercised by the practical furnace operator, is governed largely by his observation and interpretation of slag conditions. "Make the slag right and the steel will be right" is a widely prevalent slogan, and yet scientific studies of slags are to this day meager when compared with the knowledge gained through research on the behavior of the steel bath.

Such slag studies as have been published are concerned primarily with variations in chemical analysis. As applied to practical steel making these studies might be considered as "post mortem examinations" which are of little use in the treatment of a live subject, that is, while the heat is in the furnace. The present study has attempted therefore to correlate such indications of physical and chemical variables as are almost instantaneously discernible by the experienced practical melter, to be applied by him currently toward closer control of the steel melting process. Slag control, based upon observation of solidified basic open-hearth slag samples, is being practiced in many European works. Used in conjunction with metal tests for red shortness, this practice renders a service of distinct and practical value.

A preliminary study has been undertaken at the South Chicago plant of the Illinois Steel Co., and a general correlation made of the readily observed characteristics of similarly solidified basic open-hearth slag samples in respect to their chemical analysis, color, surface design, conformation and texture. No attempt has been made as yet in this preliminary study to connect the characteristics of the solidified slag samples under consideration with the inherent quality of the steel. The data obtained, however, reveal that for steel within similar carbon ranges and like conditions of charge there exists in present day practice a pronounced heterogeneity in chemical composition, color, surface design and texture of the slag.

Slag samples were taken with the ordinary melter's spoon, poured into shallow circular moulds 3 in. in diameter, ½-in. deep and cooled in air. The essential characteristics in the solidified slag cake thus formed are:

(1) Color of surface,
(2) Design on surface,
(3) Conformation of surface,
(4) Texture of cake.

Abstract of a paper before the annual fall meeting of the American Iron and Steel Institute, New York, Oct. 25.

BORN in Austria, E. J. Janitzky was graduated as metallurgical engineer from the Metallurgical Institute of Leoben, Austria. He has been successively in the employ of the Carnegie Steel Co., the Republic Iron & Steel Co., the Lackawanna Steel Co., the Jones & Laughlin Steel Co., the Minnesota Steel Co., and the South Works of the Illinois Steel Co., where he has been metallurgical engineer since 1915. He was the Henry Marion Howe medalist of the American Society for Steel Treating in 1922.

The surface of the slag samples were of a dull or lustrous black color (shade), as illustrated in Fig. 1, which shows both types, A being the dull surface and B the lustrous black.

In some cases, the slag surface contained a design or pattern which we speak of as spider-webbed, see Fig. 2. It should here be noted that the spider-web design varied from a very coarse to a fine web, as typified in Fig. 2B.

The conformation of the surface of the slag cake shows considerable variations which are classified as concave (note the sunken center of the slag cakes in Figs. 1 and 2), flat, convex or "puffed-up." All convex and "puffed-up" samples contain small gas holes, in the former case principally in the upper portion of the slag cake, in the latter, throughout the whole matrix; the flat and concave samples are very generally free of gas holes. A "puffed-up" slag is of course very gassy and represents a frothy condition of slag. Fig. 3 illustrates the "puffy" slag. The fractured slag cake is classified as dense or porous, in respect to gas holes, and as of columnar crystalline or stony structure. Fig. 4 illustrates the structural condition, A being a columnar crystalline and B a stony one. Both are dense. If piping is present, the shrinkage cavity is parallel to the base of the slag cake and is located approximately midway between the top and bottom surfaces. It is essential to have the slag free from metallic globules; cavities containing metallic inclusions (which have fallen out on fracturing the slag cake) are not to be interpreted as gas holes which would classify the sample as porous. Slags which contain large steel nuggets are useless, as by their reaction with the metal during solidification the appearance of the slag test is so changed that no interpretation is possible.

Data Analyzed

Twenty-five open-hearth heats were carefully observed and slag samples were taken, as herein described, just before deoxidizing or alloying additions were made to the bath. This moment should represent the nearest approach to equilibrium in the reactions between metal and slag of any period in the heat. The carbon content of the bath for the 25 heats studied at the time of taking the slag samples varied from 0.04 to 0.18 per cent. The present study has been confined to this (approximately) one grade of steel in order to simplify the interpretation of

Fig. 1.—Dull (A) and Lustrous Black (B) Surface of Slag Cake

the results. All slag and metal analyses, together with the classification of slag characteristics as herein outlined, are given in Table 1.

To illustrate graphically the observed relations between the physical characteristics of the slag samples as noted and their chemical composition, triangular diagrams have been prepared of the type customarily employed in the charting of three-component systems. In this way, it has been possible to select at will from the various oxides comprised by these basic open-hearth slags, various groups of three and to plot the observed characteristics of the solidified slag cakes in relation to the variations of chemical composition for each of these groups. That temperature conditions may materially affect the visible characteristics of the solidified slag test is a possibility which it was necessary to neglect in this preliminary study.

The first choice of variables was the total acids (SiO_2 and P_2O_5), earthy bases (CaO and MgO) and iron oxides (FeO and Fe_2O_3). The composition of the 25 slags, as given in Table 1, was converted to give SiO_2, P_2O_5, CaO, MgO, FeO and Fe_2O_3 as 100 per cent. The converted values, as given in Table 2, were plotted on a triangular diagram, Fig. 6. It is immediately apparent that the dull slags, 1 to 8 inclusive, separate themselves from the lustrous black slags as shown by the line A_1-A_2.

Thus one of the physical characteristics listed in Table 1 has been associated with the composition of the slag. We can now definitely say that basic open-hearth slags in heats of 0.04 to 0.18 carbon containing less than 16 per cent. $SiO_2 + P_2O_5$ (on a converted basis of SiO_2, P_2O_5, CaO, MgO, FeO, Fe_2O_3 equaling 100 per cent) will have a dull surface when a solidified sample is taken, as earlier described.

A factor of importance in its bearing on the reactivity of the slag is the amount of excess base carried in solution in the molten mass over and above the quantities required for forming with the acids present those definite molecular combinations which have been identified as typical for the ground-mass in slags of the type here discussed ($2RO \cdot SiO_2$ and $4RO \cdot P_2O_5$).*

Calculated values of excess base for the 25 slags are given [in Table 3 in the paper] in terms of molecules of excess base. It seemed advisable to plot this variable against the silica and ferrous oxide content to determine a possibly different grouping of slag characteristics as related to variations in composition. After calculating the FeO and SiO_2 on a molecular basis, the excess base together with these were recalculated to a 100 per cent basis, and the 25 slags were then plotted.

Notable Conclusions Possible

Several notable conclusions are apparent from this chart [No. 7 in the paper]. The dull and lustrous black slags again group themselves as in Fig. 6. A low silica content in the slags is accompanied by a high excess base and an increase in the ferrous oxide content. We found that the lustrous black slags comprised those of comparatively low excess base and high silica content. Thus we may conclude that the lustrous black slags are associated with low FeO content. This phase will be brought up again in relation to a discussion of cleanliness.

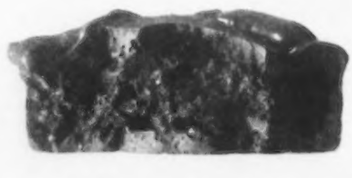


Fig. 3.—"Puffed-Up" Slag Cake, Full of Blow Holes

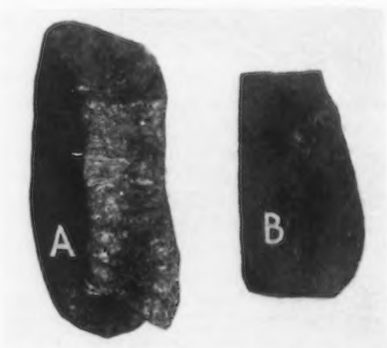


Fig. 4.—Crystalline (A) and Stony (B) Structure of Slag Cake

In an attempt to correlate the composition with the surface design on the slag cakes termed "spider-web," the variables P_2O_5, SiO_2 and excess base, all from molecular analyses converted to 100 per cent of these three variables, were plotted. Here we find that these slags showing the spider-web design separate themselves from the balance of the slags. Thus a high P_2O_5 content seems to influence the appearance of the spider-webbed slag surface. It is important to find that the dull and the lustrous black slags are again easily separated, as are the columnar crystalline from the stony dull slags, showing that crystalline slags occur with low phosphoric acid content.

Thus are related all the observed physical characteristics of the solidified slag cake which seem to be related to the composition of the slag. It is understood that all

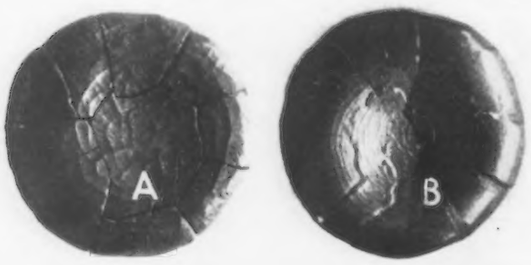


Fig. 2.—Spider-Web Design of Slag Cake (Cake Has Been Broken and Heavy Black Lines Are Not Part of Surface Design). A medium web; B fine web

*Colclough, The Physical Chemistry of Steel Making Processes, The Faraday Society and the Journal Iron and Steel Institute, June, 1925, p. 203.

Table 2—Chemical Analyses of Slags and Values Converted to 100 Per Cent for Fig. 6

Heat No.	Slag Analyses, Per Cent: $SiO_2+P_2O_5$	CaO+MgO	FeO+Fe_2O_3	Total	Values Converted to 100 Per Cent for Fig. 6: $SiO_2+P_2O_5$	CaO+MgO	FeO+Fe_2O_3
1	10.05	54.55	27.95	92.55	10.9	58.9	30.2
2	11.09	49.01	28.48	88.58	12.5	55.3	32.2
3	11.55	52.00	23.33	86.88	13.3	59.9	26.8
4	12.63	52.16	21.73	86.52	14.6	60.3	25.1
5	12.82	54.43	18.18	85.43	15.0	63.7	21.3
6	13.47	50.26	23.87	87.60	15.4	57.4	27.2
7	13.35	55.95	19.41	88.70	15.1	63.0	21.9
8	14.10	53.92	21.58	89.60	15.7	60.2	24.1
9	14.96	52.80	21.13	88.89	16.8	59.4	23.8
10	15.23	52.90	19.50	87.63	17.4	60.3	22.3
11	15.67	50.94	19.48	86.09	18.2	59.2	22.6
12	16.39	52.05	16.71	85.15	19.3	61.1	19.6
13	15.87	53.07	17.45	86.39	18.4	61.4	20.2
14	16.05	53.91	18.15	88.11	18.2	61.2	20.6
15	17.06	50.75	18.52	86.33	19.8	58.8	21.4
16	16.99	52.18	16.85	86.02	19.7	60.7	19.6
17	16.80	50.40	19.69	86.89	19.3	58.0	22.7
18	17.47	50.12	17.38	84.97	20.5	59.0	20.5
19	17.25	48.72	21.29	87.26	19.8	55.8	24.4
20	17.96	48.33	20.17	86.46	20.8	55.9	23.3
21	17.92	50.59	17.50	86.01	20.8	58.8	20.4
22	17.81	51.59	18.18	87.58	20.3	58.9	20.8
23	17.64	54.70	18.09	90.43	19.5	60.5	20.0
24	19.21	53.88	13.79	86.38	22.2	61.8	16.0
25	19.61	48.78	19.72	88.11	22.2	55.4	22.4

these groupings can be explained on the basis of the mineral composition of the different slags, but it has not been possible as yet to broaden the present work so as to include a study of mineral variations.

It is apparent that any practical application of slag samples entails relating the conclusions drawn from the slag study to the properties of the steel. One such steel property may be mentioned briefly, the matter of cleanliness. It seems apparent that low FeO in the steel will be conducive to a cleaner final steel. Thus a low FeO content of the slag is a desirable feature and the furnace operator can control his heat better by aiming to obtain a lustrous black slag surface on a test cake.

It is also probable that those slags which show the most dense structure in respect to gas cavities usually represent a condition of diminished gaseous reaction between metal and slag. It is not, however, inferred that in all cases this dense condition can be used for the determination of complete equilibrium between metal and slag, but it is believed that this density which is always accompanied by concavity be taken as an index of diminishing reactivity. For example, it is well known that the addition of iron ore to a molten steel bath results in a notable increase in reactivity which subsequently decreases and it is of interest to note that the solidified slag samples taken at intervals subsequent to ore addition exhibit

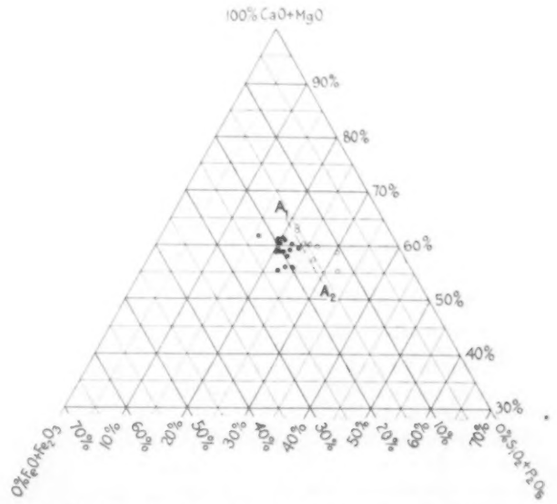


Fig. 6.—Relationship of surface coloration of slag cake to the three variables, acids ($SiO_2+P_2O_5$), earthy bases (CaO+MgO) and iron oxides (FeO+Fe_2O_3) plotted as chemical percentages. Note separation of dull from lustrous black slags. Data given in Table 2

diminishing degrees of convexity and porosity and if no further ore additions are made they become relatively dense and concave. Thus these slag tests may be employed practically and usefully as indicating the degree of

Table I—Slag and Steel Analyses and Physical Characteristics of Slags

Heat No.	Slag Analyses before Additions, Percent: SiO_2	Al_2O_3	TiO_2	FeO	Fe_2O_3	MnO	CaO	MgO	P_2O_5	S	Steel Analyses before Additions, Percent: C	Mn	P	S	Physical Characteristics: Color	Surface Design	Conformation	Texture: Density	Structure
1	8.68	1.99	.24	22.05	5.90	5.25	44.7	9.85	1.37	.29	.05	.05	.006	.031	Dull		Concave	Dense	Crystalline
2	9.30	1.47	.26	22.35	6.13	9.59	40.94	8.07	1.79	.23	.07	.21	.010	.029	Dull		Concave	Dense	Stony
3	10.00	1.32	.30	15.15	8.18	11.04	42.53	9.47	1.55	.18	.15	.22	.009	.030	Dull		Concave	Dense	Crystalline
4	10.98	1.72	.36	16.73	5.00	11.33	41.45	10.71	1.65	.22	.11	.32	.012	.027	Dull	Rippled	Concave	Dense	Stony
5	11.20	1.76	.30	13.79	4.39	11.06	43.99	10.44	1.62	.23	.18	.30	.010	.029	Dull		Concave	Dense	Crystalline
6	11.32	2.73	.30	16.54	7.33	9.23	41.56	8.70	2.15	.24	.15	.17	.009	.022	Dull	Rippled	Concave	Porous	Stony
7	11.70	1.28	.38	14.87	4.54	8.70	46.59	9.36	1.65	.20	.15	.20	.007	.025	Dull		Convex	Porous	Crystalline
8	12.48	1.96	.28	16.08	5.50	7.86	43.20	10.72	1.62	.20	.05	.12	.006	.026	Dull		Concave	Dense	Crystalline
9	13.20	2.27	.38	15.53	5.60	8.64	43.49	9.31	1.76	.17	.05	.19	.008	.027	Black Lustrous		Concave	Dense	Stony
10	13.22	1.92	.36	14.16	5.40	9.10	43.98	8.92	2.01	.24	.08	.22	.010	.027	Black Lustrous	Spiderweb	Concave	Dense	Stony
11	13.84	2.36	.40	14.70	4.78	10.51	39.92	11.02	1.83	.21	.05	.19	.011	.034	Black Lustrous		Concave	Dense	Stony
12	14.04	2.18	.44	13.14	3.57	11.80	40.35	11.70	2.35	.16	.15	.33	.014	.030	Black Lustrous	Spiderweb	Convex	Porous	Stony
13	14.04	2.26	.38	12.87	4.58	7.93	42.35	10.72	1.83	.16	.06	.21	.010	.034	Black Lustrous		Flat	Dense	Stony
14	14.20	2.06	.32	13.97	4.18	8.08	42.85	11.16	1.85	.17	.06	.16	.007	.027	Black Lustrous		Convex	Porous	Stony
15	14.66	2.00	.40	13.02	5.50	10.56	41.92	8.83	2.40	.18	.06	.24	.010	.030	Black Lustrous	Spiderweb	Concave	Dense	Stony
16	14.70	2.17	.42	12.78	4.07	10.44	42.54	9.64	2.29	.16	.04	.20	.014	.028	Black Lustrous	Spiderweb	Concave	Dense	Stony
17	14.90	2.46	.36	14.90	4.79	10.16	40.78	9.62	1.90	.20	.07	.15	.009	.028	Black Lustrous	Spiderweb	Concave	Dense	Stony
18	15.02	2.68	.44	12.40	4.98	11.97	42.42	7.70	2.45	.20	.08	.22	.010	.033	Black Lustrous	Spiderweb	Concave	Porous	Stony
19	15.24	2.75	.40	15.41	5.88	10.06	40.25	8.47	2.01	.21	.04	.18	.011	.025	Black Lustrous	Spiderweb	Concave	Dense	Stony
20	15.74	2.25	.36	14.99	5.18	11.28	41.57	6.74	2.24	.16	.04	.16	.009	.034	Black Lustrous	Spiderweb	Concave	Dense	Stony
21	15.90	2.55	.44	15.26	2.24	10.55	41.55	9.04	2.02	.19	.06	.22	.009	.030	Black Lustrous		Flat	Porous	Stony
22	16.00	2.02	.38	12.68	5.50	9.80	41.78	10.31	1.81	.17	.05	.23	.012	.031	Black Lustrous		Flat	Dense	Stony
23	16.04	3.12	.40	13.05	5.04	6.32	45.13	9.57	1.60	.16	.15	.18	.009	.030	Black Lustrous		Convex	Porous	Stony
24	16.74	2.60	.46	11.03	2.76	9.78	45.46	7.92	2.47	.17	.15	.26	.012	.030	Black Lustrous		Flat	Porous	Stony
25	17.62	2.51	.38	15.48	4.24	10.75	38.86	9.72	1.99	.12	.05	.12	.008	.043	Black Lustrous		Flat	Dense	Stony

approach toward equilibrium conditions. In other words, by taking slags during the period after the charge is melted one can gather a frozen evidence of the magma in different stages during the process. From the foregoing reasoning one may conclude that slags which show a black lustrous and concave surface are the most desirable.

It should be emphasized that the desirable slag characteristics and composition must be determined for each plant, as local variations in the analysis of the charge and fluxes used will undoubtedly affect the coloration, surface design and texture of the slag tests. Undoubtedly a viscosity test as proposed by Herty and Gaines, which is handy and may also be executed at the furnace platform, would be useful in combination with the slag solidification test.

Petrological studies will still further enhance the knowledge and define more clearly the variation in the texture of the slag specimens. It is apparent that useful information can be obtained by the study of slags in solidified form and that much work is still required in this direction. The foregoing notes are derived essentially from the observation of solidified slag tests, and it is hoped that they may be found useful in actual furnace operation and also promote thought along the lines on which this paper has been written.

Some Exceptions Taken to the Author's Calculations

Mr. Janitzky has presented a very interesting paper on a most interesting subject, basic open-hearth slags, in the opinion of Dr. C. H. Herty, Jr., Bureau of Mines, Pittsburgh. The method of studying slags is much more comprehensive than is usually attempted by the average operator and should, with some additional information, be of great help to the open-hearth operator.

One common method of judging open-hearth slags, not mentioned in the paper, is to chill the slag on the spoon and examine the color of this solidified slag. If this solidified slag is crushed and the color noted, it is possible to predict the phosphorus content of the metal very closely, provided that the phosphorus in the charge is not so high that an abnormally high percentage of P_2O_5 is present in the slag. Deep chocolate browns indicate under 0.010 per cent, phosphorus, browns and light browns indicate 0.010 to 0.015 per cent, and black slags indicate above 0.020 per cent. Many a heat of steel has been tapped out by slag color in contradiction to preliminary results from the floor laboratory.

In treating certain parts of the slag composition as ternary systems and charting on ternary diagrams, Mr. Janitzky has brought out several interesting facts. However, it is safe to assume that the originators of the ternary diagram are groaning in their graves at the method of preparing Fig. 10 [in the original paper]. In preparing this plot the author multiplied the percentage of P_2O_5 in the slag by 10 and then divided the percentage of each component by the sum of SiO_2, P_2O_5 and excess base. To multiply one component of a ternary system by 10 before calculating the ternary composition is entirely incorrect, and had the author prepared this diagram by obtaining the ternary diagram with the molal percentages as calculated and then increased the percentage of P_2O_5 by some multiplying factor such as 10, drawing lines from the apex 100 per cent P_2O_5 to the point in question, he would have obtained a diagram showing the relations between the different types of slags more plainly than shown on Fig. 10, and, furthermore, he would have been correct mathematically. In this particular case no large error was involved, but had the percentage of P_2O_5 averaged 4 per cent, instead of about 2 per cent, very serious errors would have been made in plotting.

It is to be regretted that the author did not include more ideas on the effects of different types of slags, as shown by his tests, on the quality of the steel produced. Furthermore, it is somewhat dangerous to group 0.04 per cent with 0.15 per cent carbon heats as a single type of steel, as the rate of carbon elimination was undoubtedly entirely different in heats caught at 0.15 carbon and in those at 0.04 per cent carbon.

It is to be hoped that Mr. Janitzky will later present papers on the correlation of the slag tests with the quality of the steel produced, as this would be most interesting to every open-hearth man.

German Tests of Acids During Pickling

ARGUMENTS as to the relative merits of HCl and H_2SO_4 for picking steel are summarized by Dr. Fritz Eisenkolb in *Stahl und Eisen*. Hydrochloric acid etches more rapidly and more cleanly, operates effectively at a lower temperature and leaves a residue which does not react with ammonium chloride or zinc chloride. Disadvantages are the necessity for special containers (pottery or glass), low content of acid per unit weight, and the harmful vapors coming from the bath. Furthermore, the ferric chloride formed increases the action on the steel. It should also be pointed out that the waste liquors are useless and their annihilation is therefore a matter of considerable expense.

In the case of sulphuric acid, favorable factors are its high degree of concentration, absence of noxious fumes, and the retardation of attack by formation of sulphate of iron. Baths may thus be used nearly to the saturation point. On the other hand, the bath must be heated to give sufficiently rapid action. The cleansing action is not so marked due to the lower solubility of oxides than in HCl. Baths which have been long in use tend to deposit sulphate crystals when cooled down, and these must be removed by washing.

Most harmful of impurities in acid baths is arsenic. Acids rapidly lose their strength in the presence of arsenic and the steel is covered with an arsenical deposit. The tolerance on arsenic is 0.01 per cent in 66 deg. Be H_2SO_4 and 0.005 per cent in 22 deg. Be HCl. A qualitative test can be made by diluting to 45 and 20 deg. Be respectively and adding a few cubic centimeters of a 30 per cent KI solution. The formation of a yellow colloidal precipitate indicates only traces of arsenic. A yellow flocculent precipitate indicates larger quantities and the sample should be analyzed.

Of greater importance in operation of pickling baths are periodical data on the temperature and acid strength. While thermometers serve adequately for temperature measurement, the determination of free acid in the presence of iron salts presents certain chemical difficulties.

A method now in use in Germany consists, in principle, of allowing a definite amount of the acid sample to react in a closed vessel with a weighed amount of potassium carbonate. The volume of CO_2 thus liberated is read off on a burette calibrated directly in per cent of free acid.

The taking of tests at 2-hr. intervals is recommended. It is also pointed out that the analysis of the waste liquor in this same way will frequently disclose the wastage of considerable amounts of useful acid.

Waste Prevention and Salvage

How the Steel Industry Can Save in Inventories—What It Costs to Carry Larger Stocks of Parts

BY FRANK PARRISH

CERTAIN railroads and other large users of iron and steel products report impressive salvage or reclamation savings (equivalent to waste prevention) from the disposal of scrap. Iron and steel scrap is not an incidental item in steel making. It is rather a necessary and very important raw material. Even assuming that a steel works could not itself use the scrap it produced, its volume would be such that it could not be regarded as anything other than regular product, to be disposed of as such.

In handling scrap, however, there is opportunity for prevention of expense that is unnecessary and consequently wasteful. Furnace plants must keep this expense to a minimum, as it is directly reflected in costs, but in detached or outlying operations not making ingots or castings, nor regularly handling heavy steel products, the handling of scrap does become somewhat incidental.

Industries represented by membership in this institute consume yearly a total of not less than 25,000,000 tons of scrap. Much of it has to be handled several times in its journeys from the pick-up points, by way of scrap yards, cars, etc., to the steel furnaces. Each ton of scrap entering into ingots or castings is probably handled, on the average, as much as three times. If an average saving of as much as 5c. a ton for each handling could be made, the aggregate annual saving would be nearly $4,000,000.

[Mr. Parrish told of a campaign conducted last year by the Carnegie Steel Co. in an effort to avoid waste along many lines.]

Among the common items of waste which could be mentioned are:

Leakage in pipe lines;

Extravagant use of lubricants, waste and other mill supplies, and failure to reclaim such materials when profitable to do so;

Unnecessary burning of lights, use of heat, or running of water;

Saving of fuel in cleaning furnaces;

Unnecessary use of power, by failing to turn off motors, or to use belt shifts;

Unnecessary delays to locomotives, trucks or other motive equipment;

Utilization of unused laboratory samples of fuel, etc.;

Unnecessary telephone or telegraph expense;

Waste of office supplies;

Use of discarded forms or the backs of old reports for scratch pads, rather than new paper;

Reclamation of broken or worn tools;

Salvage of containers, packing materials, etc.;

Elimination of useless reports or failure to combine into one report information required by several different officials or departments, thereby making one report do for all.

Among the suggestions either offered or developed during the campaign, and dealing with the somewhat larger operating processes more or less peculiar to the steel industry and its allied or affiliated raw material, transportation or service companies, might be mentioned the following:

Cutting down the thickness of hot saws used for a certain operation by $\frac{1}{8}$ in., whereby the production of saw chips was reduced 2000 tons annually;

Platform between two blowing engines, allowing one man to run both engines. Estimated saving $5,000 a year;

Reduction of labor required for taking and preparing samples of ore. Estimated savings $3,500 a year for one works only;

Certain changes in limestone rescreening plant, which would make a return of $8,250 yearly;

Installation of distant or secondary signals, connection of additional switches with interlocking plants and other practices leading to fewer slow-ups and stops of heavy trains carrying ore. Annual saving difficult to estimate.

A perplexing salvage problem in the steel industry is the economical disposal of machinery or power plant units which have become obsolete for economical use where installed. In many cases such equipment could put in years of useful life at some other place, where its economical capacity would meet the requirements. But, for various reasons, it is often hard to get any dismantled piece of equipment released for transfer or outside sale. It is possible that the salvage return quickly available is not so high as that which was estimated when replacement was being considered, and the impulse may be to wait for a better prospect.

The superintendent or manager may feel that it is a good thing to have it around, but it is rarely put back into use at the plant which it formerly served. The result often is that it eventually becomes so far behind the times, or depreciates so much by reason of its idleness, that no one wants it. The longer it is held, the greater the ex-

THE first position of Frank Parrish was in 1893 at the American plant of the American Bridge Co. in Chicago. He was associated with this company in Chicago and at Pittsburgh until 1917, his last position being assistant purchasing agent. From 1917 to 1921 he was purchasing agent of the Canadian Steel Corporation, Ltd., Ojibway, Ontario. Since 1921 he has been supervisor of inventories, United States Steel Corporation, 71 Broadway, New York.

This article is an abstract of a paper read Oct. 25 before the American Iron and Steel Institute, at New York.

pense of holding it and, except in extremely few cases, the less it is worth.

Heavy Costs Involved in Inventory Expense

Cost of carrying doubtful materials in inventory, not counting market price changes, amounts to several times the bare cost of the money tied up. In the expense column such items as taxes, insurance, storage, extra handling and added accounting contribute to the burden, their total being practically as heavy as that represented by interest. In the depreciation column such pillagers as deterioration, obsolescence, shrinkage and uneconomical use take their heavy toll.

By 1925 these heavy carrying costs were getting considerable attention. In an address at Atlantic City, in June of that year, R. M. Hudson of the Department of Commerce said, in part:

> One good reason for this increasing attention to better stores control is the cost of carrying too many varieties. When it is found that the average cost of carrying or maintaining supply stocks is 25 per cent of their value, and that obsolescence accounts for nearly one-half of that cost, the only logical course open is the elimination of the slow-moving, the non-standard and the excessive varieties so largely responsible for the obsolescence.

The given division of this 25 per cent total was as follows:

Storage facilities	0.25 per cent
Insurance	0.25 per cent
Taxes	0.50 per cent
Transportation	0.50 per cent
Handling and distribution	2.50 per cent
Depreciation	5.00 per cent
Interest	6.00 per cent
Obsolescence	10.00 per cent
Total	25.00 per cent

For the use of our own organization a table was prepared similar to that below. It will be noted that this contemplates annually reduced net rates of expense and depreciation, which reduced rates are due to the declining asset values on which both are based. This point is not covered by the 25 per cent set of figures. The inference is that the same net rates continue year after year, and this is another reason why the rates of 10 per cent and 20 per cent, as used in the table, are considered extremely conservative.

Average Expense and Depreciation Costs in Carrying Undesirable Materials

Year	Expense Per Cent of Original Cost	Total Cost Per Cent (Original Cost Plus Accrued Expense)	Depreciation Per Cent of Original Cost	Asset Value Per Cent (Original Cost Less Accrued Depreciation)	Per Cent of Total Cost to Asset Value
First	10	110	20	80	137.5
Second	8	118	16	64	184.4
Third	6.4	124.4	12.8	51.2	243.0
Fourth	5.12	129.52	10.24	40.96	316.0
Fifth	4.1	133.62	8.2	32.76	410.0

Expense includes interest, insurance, taxes, storage, accounting, extra handling, etc.

Depreciation includes deterioration, obsolescence, shrinkage and any other factor which reduces value, impairs efficiency, or induces the illogical or uneconomical use of material.

Surplus, obsolete or discarded materials are undesirable materials; materials ordered for contingent use become undesirable materials in the majority of cases.

Depreciation stops when the scrap or salvage value is reached.

Expense continues to accrue so long as material is held.

The full cost of material cannot be determined until it has been used or liquidated.

Experience in liquidating undesirable materials will show the rates as given to be low rather than high. It will also show that many items are held longer than five years before being used or discarded.

It has been found that insistence on putting replacement parts in service at the first good opportunity and carrying the used parts in inventory at their lower value, rather than the new parts at cost, has induced much more careful analysis of the actual need for additional procurements.

Emergency Spares Often a Costly Luxury

It is believed that there has often been too high a value placed on the advantage of carrying a surplus quota of emergency spares. The person or department responsible for unit costs frequently seeks to avoid assuming the cost of this advantage, if possible.

Various factors, among them the development of welding and the trend toward heavier and improved equipment, suggest caution in procurement of emergency spares. Should a mining or quarry operation buy one or more steam shovels there would be no good reason for putting in emergency spares, in the expectation that the next steam shovel bought would be of exactly the same size and specifications. Should any particular part develop undue tendencies to break or wear out, it would be changed or strengthened to remedy the defect; and a spare part like the one proving defective would not again be used even were it on hand waiting.

Economists have divided the responsibility for industrial waste under recent conditions as follows:

Waste for which management is responsible, 67.3 per cent;

Waste for which labor is responsible, 17.1 per cent;

Total for which management and labor together are responsible, 84.4 per cent;

Waste due to external causes, 15.6 per cent.

Trend in Dirigible Design

Rear Admiral William A. Moffett recently predicted that the framework of airships of the future, like their predecessors, will consist of duralumin with steel wire bracing.

The girders will be of a new type, stronger and more efficient than hitherto used. The outside will be covered with the characteristic aluminized fabric, drawn smooth and tight. Buoyant helium will be contained in separate cells of gas-tight fabric. Engines will be inclosed in the hull, and the latter will be strong enough to resist storm or squall conditions approximately twice as severe as the Los Angeles can successfully encounter.

Improvements in airships along technical lines are, at present, "just around the corner." Specifically he mentioned larger and speedier airships of 10,000,000-cu. ft. displacement and 100-miles speed; oil burning engines; improved sheds and terminal facilities; better weather informational service; and, finally, the development of mechanical aids for handling airships.

Protecting Buried Steel Pipe

Buried steel pipe may be adequately protected from corrosion with asphalt and asphalt saturated fabric, in the opinion of A. Saunders, research engineer Lewis Asphalt Engineering Corporation, New York. He recommends two coatings of emulsified asphalt on the cleaned steel. Before the second coat is dry, the pipe should be wrapped spirally with fabric impregnated with pure bitumen, and then finished with two more coatings of emulsion, applied either with spray gun, brush or trowel. If the pipe must be handled after covering, the sticky surface can be dusted with talc or slate powder. This procedure will produce a covering of great durability and elasticity, capable of resisting rough handling and impact of earth and small rocks when the trench is filled.

BOOK REVIEWS

Mergers, Modified by Competition and Law

Mergers in Industry. 205 pages, 6 x 9¼ in., illustrated. National Industrial Conference Board, Inc., New York. Price $3.

Mergers and the Law. 153 pages, 6 x 9¼ in. National Industrial Conference Board, Inc., New York. Price $3.

Combinations and mergers in manufacturing industry commenced about 30 years ago. The movement has gained rapidly in the years since the European war. A comprehensive compilation of data and study of the results of mergers has been brought together in these two books. The mergers discussed are those of large scale production units, combined into enterprises of nation-wide scope; public utility and bank combinations are not considered.

The merger movement is due to two causes: the increase in transportation facilities for industrial products, and the development of electric power transmission and individual motor drives, which made possible the construction of indefinitely large factories. These two developments were accompanied by the development of corporate enterprise, and this in turn was supported by a widening public interest and market for corporate securities.

Tables of stock prices, earnings and other important data have been compiled for many large combinations. The conclusions drawn from analysis of these tables are that whereas the earlier mergers or "trusts" were projected in the expectation of making large profits, the prewar mergers did not generally show larger earnings than the individual concerns had previously produced. While there were a few exceptions, many of the earlier mergers failed and were dissolved. The conclusion sponsored by the Advisory Committee of Thirteen on the anti-trust laws and their enforcement, which is the authority for publication, is that industrial consolidations in general have not provided a safe, easy and sure way to business success. They have achieved some superiority in productive efficiency; they have actually repressed to some extent the tendency to rising prices, as compared with prices in industries which are not consolidated; and they have steadied the markets and the tendency to seasonal variations in the price of products.

Their principal advantage to the nation has been in lower prices and steadier employment, which they have been able to attain; but this was forced principally by the constant pressure from small and vigorous trade rivals outside the combinations. No merger has ever completely dominated an industry to the extent of crushing out the smaller concerns.

The second volume gives a brief summary of all the important and typical cases which have been brought against combinations under the Sherman and Clayton laws. It was early decided by the United States Supreme Court that the Sherman law merely defined the economic evils which it was intended to prevent, namely arbitrary price manipulation, and restriction of opportunity of producers in the choice and conduct of their business. It was left to the courts to define the particular practices which might bring about these economic evils.

The rule of reason was early introduced by the Supreme Court, and the cases were decided with respect to the intent evidenced by the combination, including the intents previously evidenced by the members and managers of the combine. Decisions adverse to combinations were rendered where the intent was to exclude others from the trade and oppress the public; and where such intent was not in evidence, the consolidations were allowed to proceed. On these grounds 436 suits were instituted under anti-trust laws between 1890 and 1927. Sixty per cent of these were by private individuals or corporations claiming oppression by consolidations, and 40 per cent were brought by the Government against combinations, but half of these were against labor organizations which by concerted effort were attempting to interfere with interstate trade. That is, about 75 per cent of all the suits were brought for individual liberty, thus proving the necessity of the anti-trust laws.

Mergers in general are not unlawful unless they evidence an intent to acquire a monopoly and to keep down competition from those outside of the consolidation.

The two books are critical rather than constructive. They are manifestly not intended to give advice and instruction in the formation of successful mergers, but merely to record the history of mergers in the United States, the results of the important mergers, and the legal restrictions which have thus far been defined by the courts under the anti-trust laws.

STERLING H. BUNNELL.

Student Guide to Micrography

Photomicrographs of Iron and Steel. By Everett L. Reed. 253 pages, 6 x 9¼ in., 218 figures, consisting of photomicrographs; seven appendices. John Wiley & Sons, Inc., New York. Price $4.

The main value of this book is to students of metallography interested in microscopic work. It opens with a graceful and characteristic introduction by Professor Sauveur giving a brief review of micrographic work in this country. The body of the book consists of reproductions of photomicrographs. There are 218 of these reproductions, divided into 18 main groups, starting with pure iron, commercially pure iron, wrought iron, cast steel, rolled steels, various heat-treated steels, alloy steels and various kinds of cast iron.

In general the photographs are good; some are exceedingly beautiful and reflect great credit on Mr. Reed's skill and care, both in preparation of the specimens and in the photography. In some respects the structures are not described with enough detail. Since this is a book for students, the structures that are not simple and fairly obvious should have had a little more description. The author is in a position to carry this out and should do it in succeeding editions.

A few suggestions may be made. Fig. 7 on page 7 with 0.62 per cent sulphur hardly comes under the class of commercially pure iron. Fig. 45 on page 31 of high-carbon cast steel may show lamellar pearlite on high magnification but looks more like sorbitic pearlite as given. The micrographs of hot-rolled steel should state whether they are transverse or longitudinal sections; some are transverse but the banded structures are probably longitudinal. The hardened hot-rolled steels on page 63 should be described more fully, and Fig. 93 of a 0.35 per cent carbon hardened and drawn steel would seem to show ferrite as well as sorbite. Also Fig. 117 on page 90 looks more like martensite than austenite. Fig. 129 on page 103 looks rather strange for a 0.50 per cent carbon steel slowly cooled in the furnace; there is little ferrite and the ground mass is sorbitic pearlite—probably the

steel is quite high in manganese. The semi-steels on page 207 are not so clear or good as most of the other photographs, and it is hard to distinguish the steadite mentioned.

The last 38 pages of the book consist of appendices covering the preparation of microscopic specimens, definitions of terms, identification of non-metallic inclusions, developing of films and plates, and printing of photographs. They add greatly to the value of the book.

G. B. WATERHOUSE.

How Surface Damage Affects Fatigue

Der Einfluss von Oberflächenbeschädigungen auf die Biegungsschwingungsfestigkeit. By W. Zander. 65 pages, 6 x 9 in., illustrated. Published by NEM, Matthäikirchstrasse 10, Berlin, W. 10, Germany.

This publication records the results of an investigation made by the author under the direction of Professor Föppl, and is a distinct contribution to the study of the effect of surface defects on the fatigue strength of metals. Fatigue specimens were made of duralumin, low-carbon steel, oil-quenched chrome-nickel steel, and oil-quenched molybdenum-tungsten steel, and artificial defects then produced by needle-point scratches, files, lathe tools, grinding disks, diamond point scratches, razor blade cuts, friction saws, chisel marks, and indentations of round steel points under pressure.

Fatigue tests were then made on a rotating-beam type of machine, and the amount of damage done was estimated by the percentage of reduction of endurance limit for damaged specimens. Detailed methods of getting stress values for endurance limits at the section where the specimen fractured are given in the article.

A large amount of test data is presented, and many photographs of damaged surfaces and of fatigue cracks. The length and depth of the various scratches and cuts are carefully recorded, but no attempt has been made to record radius of curvature at the bottom of scratch or cut.

The reduction of fatigue strength by the various artificial surface injuries varied all the way from 15 to 73 per cent. The damage caused by indentation of steel points under pressure seemed to be very severe, and, in general, duralumin seemed to be somewhat less affected by defects than were the steels. These general results are not out of harmony with the results of other studies of the effect of surface defects on fatigue strength.

H. F. MOORE.

Human Side of the Railroad

The Story of the Baltimore & Ohio Railroad. By Edward Hungerford. Two illustrated volumes; Vol. I, 372 pages; Vol. II, 351 pages. G. P. Putnam's Sons Co., New York. Price $10.

This book is in reality a romantic chronicle of the human side of a great transportation system. A vivid portrayal of the first meeting, the chartering of the road, the ready response of the populace to subscribe funds, and the laying of the "cornerstone," places a picture of confidence and determination squarely before the reader. Doubt soon replaced confidence, as difficulties of construction, quarrels, animosity and depletion of funds caused the work to lag. But the pioneers were determined and won, rallying again the spirits of their supporters, and we see great parades, celebrations and rejoicing as the first unit was completed and service commenced.

From a novelty and a pleasure jaunt, this new creation became a thing of utility. It was destined to be a time and money saver, and have a powerful influence on the productivity and the expansion of the country.

The pioneers exerted remarkable ingenuity in their tasks of construction. Crude tools were available, but their resourcefulness conquered many a difficulty. The solidity of many bridges, fashioned by hand and not by formula, rugged character of the first rail roadbed, and the inventive spirit of mechanical minded men toward creation of steam power truly shows the thoroughness of these ambitious men. In power alone we see a steady stream of remarkable changes from the horse to the sailboat, the introduction of steam power, with its numerous queer creations, stimulation of improvement through trials and prizes, and the early culmination of success, exemplified in Peter Cooper's "Tom Thumb."

While these developments were proceeding, the little official family directing the property was brought face to face with the fierce struggle being waged by the interests backing canals and waterways. Factions in the Federal and State Governments fought to eliminate or hedge in the iron horse, as the very existence of the canal system was at stake. Needless to say, the iron horse was in the ascendency and practically superseded its rival in less than two decades. Guidance of the road from its inception was transferred frequently from one master to another as new energy and vision were necessary to accelerate progress and to cope with the delicate problems of finance and expansion and to thwart attempts of lobbyists to strangle this growing and valuable public servant.

There was rich commerce to be reached both west and south, and far-seeing prophets in the management were quickly discerning their opportunities. Through panics and trials, difficult financing problems, bickerings and injustice of State officials, and in the face of almost insurmountable natural obstacles to construction, they moved on steadily.

Improvements in power, equipment and operation kept a steady pace with expansion, and we witness a marked increase in efficiency, shortening of delivery time and travel, and reduction in rates and fares. This is ascribed in no small measure to the thoroughness and infinite care applied in directing the road and its operations. Every item was carefully scrutinized; the operating rules were models in outlining details for the movement of trains and the duties of employees.

It was a stroke of fortune that the destinies of the Baltimore & Ohio were placed in the hands of John W. Garrett in 1858 for the trying days and years ahead. He continued in power for a quarter of a century. The opening drama of the Civil War involved the road through John Brown's raid at Harper's Ferry. The energy of the road and its resourceful leader was of tremendous aid in the long struggle that ensued, even though the road bore the brunt of many disastrous conflicts and devastations. Reconstruction came as an aftermath of warfare, followed in sequence by hard times, poverty and difficulties of financing. But Garrett had the will and forcefulness to carry on, building up the property as he went, overseeing even the minutest details personally, combating the powerful interests of competing lines, expanding the facilities and reaching out toward rich goals of commerce, so that his name is indelibly carved in railroad annals as one of its greatest figures.

In the succeeding years strenuous efforts were made to carry on the tremendous work initiated by John W. Garrett. But his successors were not entirely equal to the task until a receivership was necessary to right the financial structure. While this was of short duration, a powerful rival gained control, and for years the Pennsylvania railroad was involved in the destinies of the road.

The quick recovery added confidence in the soundness of the plans and policies of the road, which proceeded with new impetus. Correction of line, improvements in

power, equipment and shop facilities, terminals for more rapidly expediting shipments, double-tracking, and expansion into territory controlled by rival interests, added greatly to the power and efficiency of the road. Several able presidents directed this work until finally Daniel Willard took command after the beginning of the new century and has been responsible for the tremendous improvements which have occurred in the past 18 years. Oddly enough, two men, John W. Garrett and Daniel Willard, directed the destinies of the road for a combined service of nearly half its existence.

Labor difficulties occurred at various times, but the loyalty of the vast army of employees always won. The most serious difficulty perhaps was that following the close of the World War. But good has developed from that, as frank discussion leads to better understanding, and mutual problems are adjusted by peaceful means.

The present Baltimore & Ohio, through the period of Mr. Willard's administration, is too well known and respected to need much comment. Its financial structure is sound, and the physical character of the property is of the highest order. By acquisition of numerous smaller roads and its own expansion, it now serves a population far beyond the highest dreams of its founders.

Mr. Hungerford's book is devoid of the usual drab details of railroad statistics, just sufficient being introduced to carry the imagination of the reader into the picture of the progress being made. The keynote of the book is the power of the human being in conceiving, building, expanding and directing the destinies of that all-important link in the transport of life and the products of commerce—the railroad. C. B. BRONSON.

Rolling Mill Encyclopedia

Handbuch des Eisenhüttenwesens Gruppe Walzwerkswesen. Edited by J. Puppe and G. Stauber. 777 pages, 7½ x 10½ in., with 946 illustrations. Verlag Stahleisen, Düsseldorf, Germany. Price 85 marks.

"Walzwerkswesen" is to be a collection of books on rolling mill engineering and rolling mill practice, the first volume of which has now been published. The plan and scope of the complete work on rolling mill practice and rolling mill engineering is monumental, if we may judge from the contents of the first volume, which consists of 12 sections dealing with steel rolling mills and their economic importance, with the history of rolling mills, with constitution and properties of steel, the constitution of non-ferrous metals, the testing of materials, with specifications and tolerances, with cost accounting in rolling mills, operating statistics of rolling mills, superintending and operating problems, with the nature of the rolling process, with the roll and its arrangement in the housing, and with the combinations of roll trains in their formation of rolling mills.

Many of the steel works statistics and the description of economic conditions are, quite naturally, of much greater interest to European engineers and mill superintendents than to those located in the United States. They will, however, be of value to those who make a study of the possibilities of exporting iron and steel to European countries.

In a similar manner the sections dealing with accounting will be of greater interest to European works managers than to American, unless it be for the purpose of comparing our methods with those used on the other side of the Atlantic.

The historical development of rolling mill practice is of universal interest, and so are the sections dealing with the constitution and properties of ferrous and non-ferrous metals. The last two sections, namely those dealing with the rolling process as such, with the rolls and their arrangement in the housing and with the combination of roll trains into rolling mills, are of the most importance.

The preface states that the beginnings of the book have their origin in the time before the World War, and that it was the latter that has kept the book from being published sooner, and which at times made its publication rather problematical. We are promised that the second volume will contain the rolling of ingots and slabs into blooms and billets and the rolling of heavy sections, such as beams, rails, ties, special beams, wire rods, wire, plate and sheets. The third volume is to contain special rolling mills and also mills for the production of tubes, the rolling of alloy steels, cold rolling, the rolling of non-ferrous metals, rolling mill engines and electric drives, also auxiliary equipment of rolling mills. The fourth volume is intended to contain conveying and finishing machinery, rolling mill furnaces, the power required by roll trains, the supporting and lubrication of rolls, making of rolls, roll turning and grinding, and an appendix on roll pass design.

The publishers as well as the editors are to be congratulated upon what has been accomplished.

W. TRINKS.

A 60-page booklet entitled "Ten Years of the Iron and Steel Industry in Independent Poland," has been printed in English by the Committee of the Polish Mining and Founding Industry for the National Exhibition at Warsaw. A rapid expansion of the steel industry since the war is graphically shown by tables and charts. Production is still less than the pre-war output of iron and steel in Poland, but with the exception of open-hearth steel. The number of employees has increased steadily since 1924; in 1928 the total reached 52,753. Figures on distribution of output show that Poland consumed about 90 per cent of the total production.

New Books Received

Seven Iron Men. By Paul de Kruif. 241 pages, 6 x 9 in., illustrated. Harcourt, Brace & Co., 383 Madison Avenue, New York. Price $3.

Trends in Foundry Production in the Philadelphia Area. By Anne Bezanson and Robert Gray. 77 pages, 6 x 9½ in., illustrated. University of Pennsylvania Press, 3438 Walnut Street, Philadelphia. Price $1.50.

Formulas and Tables for Engineers. Third edition. By C. A. Peirce, W. B. Carver and C. E. O'Rourke. 228 pages, 4¾ x 7¼ in., illustrated. McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price $2.50.

Blueprint Reading. By Joseph Brahdy. 199 pages, 6 x 9¼ in., illustrated. McGraw-Hill Book Co., New York. Price $2.

The Soviet Union Looks Ahead—The Five-Year plan for Economic Construction. 275 pages, 5¼ x 7¾ in., illustrated. Horace Liveright, 61 West Forty-eighth Street, New York. Price $2.50.

Forty Years with General Electric. By John T. Broderick. 220 pages, 5¼ x 8 in., illustrated. Fort Orange Press, Albany, N. Y. Price $2.50.

Journal of the Institute of Metals. Vol. 41. 825 pages, 5½ x 8½ in., illustrated. The Institute of Metals, 36 Victoria Street, London, S.W.1., England. Price 31s. 6d.

Mineral Industry During 1928. Vol. 37. 802 pages, 6½ x 9½ in. McGraw-Hill Book Co., New York. Price $12.

Oxy-Acetylene Welder's Handbook. By M. S. Hendricks. 208 pages, 4½ x 6¾ in., illustrated. Acetylene Journal Publishing Co., Chicago. Price $3.

Carnegie Scholarship Memoirs. Vol. 18. 94 pages, 5½ x 8½ in., illustrated. The Iron and Steel Institute, 28 Victoria Street, London, S.W.1, England.

Journal of the Iron and Steel Institute. Vol. 119. 916 pages, 5½ x 8½ in., illustrated. The Iron and Steel Institute, London, S.W.1, England.

Steel Corporation Buys Coast Plants

Purchases Assets of Columbia Steel Corporation for Some $23,000,000 Par Value of Its Own Common Stock

THE United States Steel Corporation announced Oct. 31 the exercise of the option which it had held for the past several months on the properties of the Columbia Steel Corporation. The statement was as follows:

"For several years the United States Steel Corporation has had under consideration the location of manufacturing operation on the Pacific Coast, the better to serve its existing trade, as well as to prepare for the future growth of both domestic and foreign trade, by service from coast plants. It is economically logical that the corporation should establish itself in the Far West. Its nearest present manufacturing operations of any substantial character in the North are in Illinois, in the Chicago District, and at Gary, in the Indiana District; and in the South at Birmingham, Ala.

"The purchase of Columbia's properties has been determined upon by the United States Steel Corporation after an extended and exhaustive examination, inspection and study of the properties and their possibilities. The growing demands for steel of various kinds in Pacific Coast territory and the greater demands of customers for improved service make it desirable that the corporation have its own producing plants located there.

"This purchase of Columbia properties affords a nucleus from which it is confidently believed the productive capacity on the Coast can be expanded from time to time, both to the interests of consumers and the territory. The present annual steel ingot capacity of Columbia is 340,000 gross tons, which is converted into a relatively narrow range of finished products. This will increase the United States Steel Corporation's proportion of the total annual steel ingot production of the United States, based on 1928 output, from 39.02 to 39.52 per cent, an increase of one-half of one per cent.

"The properties are to be purchased at approximately $46,630,000 on Feb. 1, 1930, payment to be made wholly in common stock of the United States Steel Corporation."

From a supplementary statement made by Myron C. Taylor, chairman of the finance committee of the Steel Corporation, it would appear that the cost of the Columbia Steel purchase in terms of the par value of the common stock of the United States Steel Corporation will be somewhat in excess of $23,000,000. This statement came in answer to a question respecting a report from San Francisco that the Columbia stock was to be exchanged at 17 for United States Steel at 199.75, making an exchange ratio of 11.75 shares of Columbia for one share of United States Steel. Mr. Taylor replied:

"That is not quite accurate. Columbia's assets are sold for our stock, and in the liquidation of the Columbia company they may calculate a resulting price per share for their shares through the liquidation. But that is their matter and does not concern us at all, our purchase being of assets for stock. The price basis at which our stock is taken is approximately correct."

From the foregoing it will be seen that the $46,630,000, mentioned as approximately the purchase price, would represent $23,344,000 par value disbursed at 199.75.

The Properties Purchased

The properties of the Columbia Steel Corporation include a modern blast furnace near Provo, Utah, together with a by-product coke oven plant of 850 tons daily capacity; rolling mills at Pittsburg, Cal., and at Torrance (Los Angeles), making steel bars, sheets, wire, nails and tin plate, and steel castings at Pittsburg, Cal., and Portland, Ore., besides raw material properties, including coal, iron and limestone in Utah. The latest development of the Columbia Steel Corporation was the building of a tin plate plant at Pittsburg, of 40,000 tons annual capacity, which was put into operation on March 12, this year. It also increased its open-hearth capacity this year at that plant by the addition of two 65-ton furnaces. The Columbia corporation, owned jointly with the McWane Cast Iron Pipe Co., Birmingham, a cast iron pipe plant at Provo, Utah, of 20,000 tons annual capacity, operated as the Pacific States Cast Iron Pipe Co.

It is believed that an expansion in the tin plate plant is an early likelihood, seeing that the Pacific Coast consumes, largely in the food packing industries, 350,000 to 400,000 tons a year.

Pacific Coast Consumption

Consumption of the Pacific Coast States, including British Columbia in Canada, is now probably of the order of 2,500,000 net tons a year. In round numbers 400,000 tons comes from the Pacific Coast plants, leaving something over 2,000,000 tons to come from other sections of the country. It is estimated that the bar and rod tonnage is 450,000 tons, probably 60 per cent of local origin. Rail tonnage may be put at 200,000 gross tons. The next largest class of steel in point of consumption is tin plate, amounting to as much as 425,000 net tons, less than 10 per cent made on the coast. Structural steel may account for 225,000 tons, 20 per cent of coast manufacture; sheets for 175,000 tons, 30 per cent of coast manufacture; plates for 175,000 tons and pipe, including seamless tubes, 400,000 tons. Between 300,000 and 400,000 tons covers a miscellaneous classification.

Aircraft Symposium Planned By Testing Society

A symposium on aircraft materials is being planned for two sessions of the 1930 annual meeting of the American Society for Testing Materials. The committe on papers and publications has secured the cooperation of an advisory committee which will assume the responsibility for soliciting the papers and authors. This committee is made up of the following members:

H. C. Knerr, chairman, consulting metallurgical engineer, Philadelphia; E. P. Warner, editor, *Aviation*, McGraw-Hill Publishing Co., Inc., New York; Dr. G. W. Lewis, Washington, representing the National Advisory Committee for Aeronautics; Commander R. D. Weyerbacher, manager, Naval Aircraft Factory, U. S. Navy Yard, Philadelphia, representing the Bureau of Aeronautics, U. S. Navy; J. B. Johnson, chief material section, Air Corps, Wright Field, Dayton, Ohio, representing the Army Air Service; Major Clarence E. Young, chief, aeronautics branch, U. S. Department of Commerce, Washington, representing the Department of Commerce; H. L. Whittemore, chief, engineering mechanics section, VI-5; Dr. H. S. Rawdon, chief, metallurgical division, U. S. Bureau of Standards; Dr. Alexander Klemin, consulting engineer, school of aeronautics, New York University, representing the Guggenheim Foundation; Dr. J. S. Newell, representing the Massachusetts Institute of Technology; Harold Backus, materials engineer, Berliner-Joyce Co., Baltimore; Captain H. C. Richardson, director of engineering, Great Lakes Aircraft Corporation, Cleveland; T. P. Wright, engineer, Curtiss Aeroplane & Motor Corporation, Garden City, Long Island, N. Y., and R. R. Moore, metallurgist, Wright Aeronautical Corporation, Paterson, N. J., representing aircraft and engine manufacturers; R. S. Archer, director of research, Aluminum Co. of America, Cleveland, and Dr. J. A. Mathews, vice-president and metallurgist, Crucible Steel Co. of America, New York, representing materials manufacturers.

From 12 to 15 paper will be secured, each definitely limited in size so as to constitute a résumé and a summary of existing knowledge on the subject.

For Officers of Institute

The following candidates have been nominated to fill seven vacancies on the council of the American Institute of Weights and Measures, 33 Rector Street, New York, to serve until December, 1932: George M. Bond, specialist in precision measurement, Hartford, Conn.; E. F. DuBrul, general manager, National Machine Tool Builders' Association; J. B. Ennis, vice-president, American Locomotive Co.; A. R. Erskine, president, Studebaker Corporation; Otto H. Falk, president, Allis-Chalmers Mfg. Co.; Robert H. Irons, president, Central Iron & Steel Co., and Charles D. Rice, vice-president, Underwood Typewriter Co.

American Scrap Exports Gain Heavily

Shipments During Eight Months This Year Averaged 44,949 Tons Monthly Against 43,012 Tons in 1928—Shortages Abroad

BY LUTHER BECKER*

THE unprecedented shipment of iron and steel scrap by the United States to foreign markets during the past two and a half years has created an unusual interest among the domestic dealers of this country, indicated by numerous inquiries as to the economic reasons behind the sudden and phenomenal growth of this trade. The use of scrap iron and steel abroad has increased steadily during the past few years in the making of raw steel. In some instances furnaces are now being charged with as much as 60 per cent scrap and only 40 per cent pig iron. This trend has been particularly true in several of the European and Asiatic countries where there is a scarcity of domestic iron ore, notably such countries as Italy, Poland and Japan, and, to a lesser extent, Germany and Belgium. Due to this increased demand and the resultant relative scarcity of scrap, the prices of this commodity abroad have risen until it is now profitable to ship this material from the United States great distances to a market.

The accompanying table showing the principal countries to which scrap has been shipped during the past six years should prove an interesting study. The trade in scrap during the period since March, 1927—the beginning of this large movement—has been very erratic, increasing from a total of 15,416 gross tons shipped during that month to 30,124 tons shipped in September, 1927. Fluctuations during 1928 were even more pronounced, varying from a total of 70,538 tons shipped during the record month of August, 1928, to only 16,306 tons shipped in the following November. Shipments during the first eight months of the current year have averaged 44,949 tons monthly as compared to the 43,012 tons monthly average maintained during 1928, a slight increase despite the fact that there have been no unusual months during the current year such as August, 1928.

Canada's Imports Increasing

There have been several other contributing causes to our increased shipments of scrap during the past two years. Canada, the largest purchaser of this material from the United States, experienced great difficulty in effecting a readjustment of its steel industry following the war

*An address delivered to the Institute of Scrap Iron and Steel in New York City, Oct. 24, by Luther Becker, chief of Iron and Steel Division, Department of Commerce.

Luther Becker, Chief of Iron and Steel Division, Bureau of Foreign and Domestic Commerce

but during the past two or three years conditions in its steel mills have improved and it has increased its purchases of scrap from the United States until during 1928 it took 178,528 tons of this commodity, more than four times the amount of its purchases in 1923 and almost six times those of 1925.

Japanese purchases of scrap from the United States have increased tremendously during this period, due almost entirely to the unsettled conditions prevailing in China. The iron ore resources of Japan are extremely small, as is also its domestic supply of scrap, making it almost entirely dependent upon foreign sources for supplies of raw materials. China, which has for many years been the chief supplier of Japanese imports of iron ore, has been suffering from civil wars during the past few years and the resulting disturbed conditions in that country have practically eliminated it as a source of Japan's imports. Upon finding itself cut off from its usual supply of raw materials, Japan turned to the United States for a large proportion of its scrap and has increased its purchases from this source from 8670 gross tons in 1923 to 160,427 tons in 1928 and 97,160 tons through the January-August period of the current year.

Shipments to European countries have also increased and have been greatly aided, first by the strike in the Swedish iron ore mines in 1927, and second, by restrictions placed upon the exportation of scrap by the governments of Sweden, France, Italy and Germany. Other contributing causes have been the increase in the Polish production of steel, the partial exhaustion of Spanish iron ore and the completion of the recovery of scrap from the battle fields of Europe.

Italy, our largest European purchaser of steel melting scrap, draws mainly for its iron ore supplies from the island of Elba, Greece and Russia, and to a lesser extent Spain, and because of the paucity of its domestic ore resources, supplements these with a considerable use of scrap purchased abroad. France has been, until the current year, Italy's chief source of supply for this commodity, but since the French Government has greatly restricted the export of scrap to Italy it has turned to other countries for these purchases, and as a result of which the United States has increased its participation until, during the first six months of 1929, it became the chief supplier of this market followed in order by Argentina, France, the United Kingdom and Egypt. The United States' trade with Italy in scrap during 1926 amounted to only 12,147 tons, which increased to 73,348 tons last year and 65,710 tons during the first eight months of 1929.

Poland is the second largest market for American scrap in Europe and while, unlike Italy, it has a fairly extensive domestic ore supply, its resources are not sufficient to meet the demand of the Polish steel industry, and is mainly of a low grade. All high-grade ore is imported, chiefly from south Russia and partly from Germany and Sweden. In order to supplement its ore supplies to an extent where they will be sufficient to meet the tremendously increased production of the steel industry—an increase which has risen from 70,000 metric tons of raw steel produced during 1920 to 1,436,901 metric tons produced during 1928—Poland has found it necessary to import large quantities of scrap material. Difficulties experienced in the amicable settlement of its trade agreement with Germany and the restrictions on the exportation of French and Swedish scrap have been largely responsible for the opening of this market to American scrap, our exports having increased to this country from 14,858 gross tons shipped in 1927, the first year we participated in this trade, to 63,274 tons

United States Exports of Iron and Steel Scrap 1923-1929

(In Gross Tons)

	Year						First 8 Mos.,
	1923	1924	1925	1926	1927	1928	1929
Belgium	.....	.....	.....	.....	12	243	552
France	25	45	.....	.....	.....	1,648	.....
Germany	20	.....	2	385	9,367	18,984	16,681
Italy	.....	17,051	31,626	12,147	30,185	73,348	65,710
Poland and Danzig	.....	.....	.....	.....	14,858	63,274	68,103
United Kingdom	200	2,036	1,533	2,120	3,163	1,740	2,170
Canada	46,875	55,438	31,017	66,212	92,514	178,528	81,452
Mexico	30	405	261	819	2,983	4,711	5,827
Argentina	.....	.....	5	.....	.....	410	.....
China	7,333	13,206	5,627	3,824	4,017	9,222	6,695
Hong Kong	1,630	1,273	1,035	194	724	1,022	329
Japan	8,670	6,920	8,066	18,868	71,087	160,427	97,160
Kwantung	100	20	.....	25	9	1,110	2,093
Philippine Islands	.....	18	108	73	429	925	619
Netherlands	.....	.....	.....	.....	9,402	93	24
Spain	.....	.....	3,194	.....	.....	.....	7,627
Other countries	1,097	1,336	99	71	409	454	4,553
Total	65,980	97,748	82,573	104,738	239,159	516,139	359,595

in 1928 and 68,103 tons during the first eight months of 1929.

Trade with Germany Increasing

With the exception of Poland and Italy, the only other important market in Europe, at the present time, for American scrap is Germany. Our trade with this country last year was more than double that of 1927, while shipments during the first eight months of 1929 indicate that the current year will show a large increase over the shipments of 1928. China has always been a fair market for scrap material, most of her purchases, however, being of mild steel in the form of plate cuttings, old horse shoes, wire shorts, etc., which are more easily worked in her small shops and are used in the making of all kinds of forged tools and simple steel manufactures.

Import Trade in Scrap Steady

In contrast to our export trade in scrap, imports of this material into the United States have remained practically stationary since 1924, there having been 66,841 gross tons of this material brought into the United States that year as compared to 63,314 tons during 1928. Indications are that the current year will show a substantial gain over last year as receipts during the first eight months are slightly in excess of the total tonnage received during 1928. Canada, the largest supplier of scrap to the United States, usually takes from two-thirds to nine-tenths of this trade, while Cuba makes sporadic shipments of large quantities of scrap. The United Kingdom, the only other country which has participated to any great extent in the movement of scrap to this country, has fallen off in its shipments during the current year, our purchases from this source having amounted to only 636 tons during the January-August period as compared to total purchases of 8190 tons last year.

What Is Quality in Wrought Iron?

Committee A-2 on wrought iron, of the American Society for Testing Materials, of which H. W. Faus, engineer of tests of the New York Central lines, is chairman, and G. H. Woodroffe, manager of the boiler tube department of the Reading Iron Co., is secretary, is engaged in the study of what constitutes quality in wrought iron. The information gathered by the committee on this subject should be of importance to the entire wrought iron industry. The committee has also completed physical and chemical tests to determine the effect of phosphorus on the physical properties of staybolt iron. The results of these tests will appear in the annual report of the committee for 1930.

The committee is engaged in the preparation of a definition for wrought iron. With the adoption of this definition it is expected that the process clauses of the various A. S. T. M. specifications covering wrought iron products will be revised to include wrought iron made by any process so long as the other requirements of the specifications are complied with.

A revision is under consideration of the specifications for staybolt, engine bolt and extra-refined wrought iron bars and of the specifications for hollow rolled staybolt iron to consist of a change of the definition of "box pile," and an increase in the requirements for reduction in area in the latter specifications from 42 to 48 per cent.

United States Imports of Iron and Steel Scrap 1923-1929

(In Gross Tons)

	Year						First 8 Mos.,
	1923	1924	1925	1926	1927	1928	1929
Belgium	.....	200	600	83	724	6	19
France	2,511	186	2,775	.....	.....	216	378
Germany	853	1,388	1,434	974	232	1,053	706
Italy	2	100	.....	.....	4	385	763
Denmark	.....	.....	.....	2,326	25	.....	.....
Sweden	1,540	845	1,671	520	455	840	776
United Kingdom	16,940	5,239	333	8,869	8,754	8,190	636
Canada	97,469	49,043	58,017	45,838	42,689	49,974	59,056
Panama	880	505	16	7,748	.....	381	.....
Mexico	1,989	600	1,406	8,004	75	93	44
Jamaica	.....	.....	.....	2	.....	628	.....
Dominican Republic	5,637	2	.....	.....	366	438	125
Ecuador	.....	.....	.....	.....	.....	700	.....
Cuba	30,775	6,721	32,230	10,400	6,196	.....	1,635
Barbados	.....	.....	.....	.....	.....	.....	140
British India	.....	.....	921	.....	520	300	.....
Peru	850	1,015	.....	.....	.....	.....	.....
Netherlands	.....	983	.....	1,500	11	.....	13
Chile	2,562	4	.....	11	.....	.....	.....
Other countries	50	10	412	450	158	110	116
Total	162,058	66,841	99,815	86,725	60,209	63,314	64,407

Iron and Steel at Chicago Fair in 1933

One hundred years of development in the iron and steel industry is to be a feature of the Chicago World's Fair Century of Progress Celebration to be held in 1933. Recommendations to the science advisory committee of the National Research Council have been made by W. H. Eisenman, national secretary of the American Society for Steel Treating, a member of the committee. He is collaborating with other members in working out a basic plan for the Chicago fair authorities which will enable them to present to the public advances made in pure and applied science from 1833 to 1933. Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, New York, is chairman.

Commenting on the part that iron and steel should play in the forthcoming exposition, Mr. Eisenman says: "Progress of the iron and steel industry during the last century provides some of the most remarkable developments since the first use of iron by man. Introduction of the Bessemer, open-hearth and electric methods for the manufacture of steel constitute epoch-making events during the century. Not less remarkable in the progress of the metal industry has been the development during the past 25 years of high-speed steel, stainless steel, corrosion-resisting and heat-resisting alloys, tungsten carbides, and their effective influence on industry in general."

During the past year and a half $5,444,137 in life insurance policies has been taken out by employees at Hawthorne (Ill.) works of the Western Electric Co. Altogether some 2500 persons have taken out policies under a plan which enables them to pay by weekly deductions from salaries.

Magnetic Tables to Handle Steel

Bars, Pipe and Other Sections Pulled Along by Magnetized Rollers—Omits Long Gear Shaft

A DEVELOPMENT now attracting considerable interest is the use of magnetic tables for handling steel. A magnetic table consists of idlers and a number of driven rollers whose traction is increased magnetically. When handled on tables of this type the material is drawn to the rollers, producing the same effect as pinch rolls but without any top roll to interfere with handling the steel or to mar it.

Tables with magnetic rollers can be used for handling steel in mill lengths in about all forms, either cold or after rolling, when the temperature has been reduced well below the critical point. A cooling bed for handling steel bars, which has a number of new features in design, and a shear approach table of the magnetic type were developed recently by Willis McKee, engineer and contractor, Terminal Tower Building, Cleveland.

Either the magnetic shear table or one of standard line-shaft construction can be used in connection with the hot bed. Applying the same principle, a table with magnetic rollers has just been installed by an Ohio mill for handling electrically welded pipe.

The runout is designed for the use of Schloemann Motor-Rollers, which units are totally inclosed. The shafts of the alternating-current motors are held against rotation and the rollers are mounted outside the rotor of the motor. The motors are mounted on two bars, which can be moved in opposite directions by a beam.

tendency for the bar to run off the rollers.

It is pointed out that, by discharging the material from the rollers by the skewing motion, there is eliminated the tendency to distort the bars which exists when kickoffs or lifting aprons are used. The material is delivered from the rollers to machined troughs which are so designed as to straighten the bars further when they are thrown against the sides of the troughs.

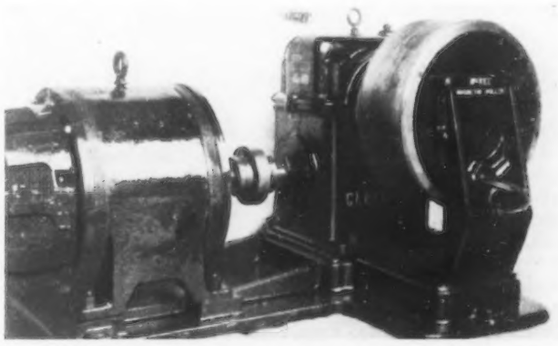
Balanced Hot Bed, Delivering to Either Side

On each side of the runout are two sets of notched machined supports, one set moving and the other fixed. On a line shaft under the bed are, at regular intervals, two sets of eccentrics, one of which controls the horizontal motion of the moving supports and the other, the vertical movement, through walking beams. With this design it is stated that any desired elliptical motion can be imparted to the moving supports. These are in a normal position when the two sets of moving supports are at the same elevation of about 1 in. below that of the fixed supports.

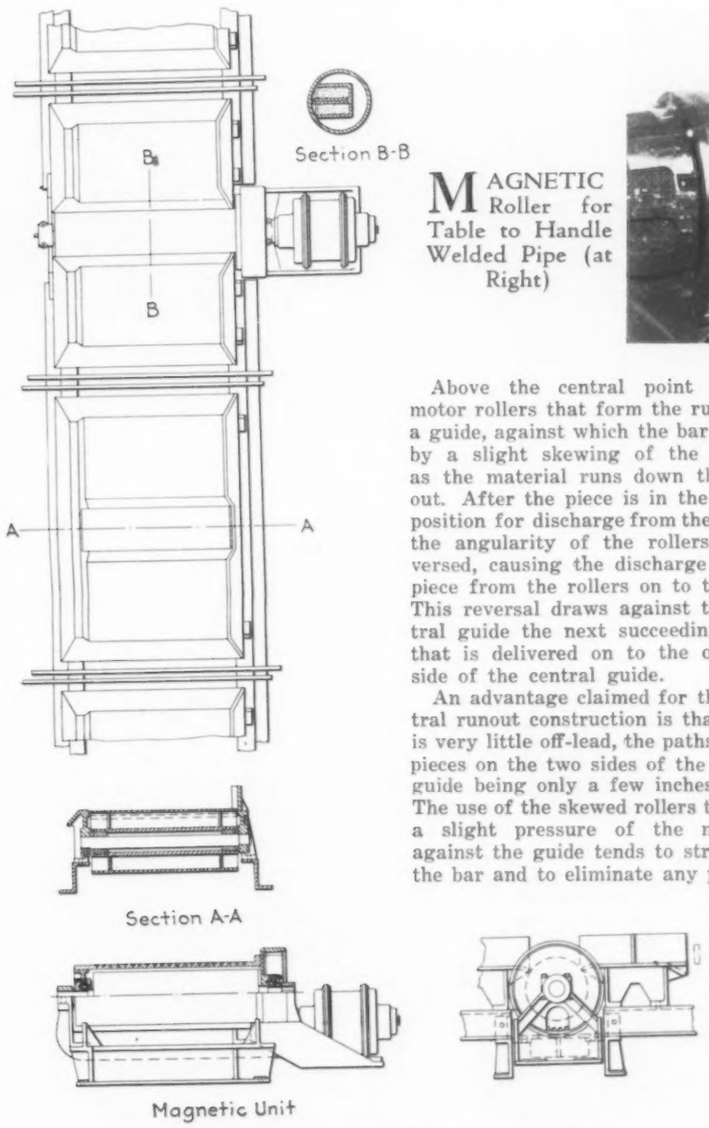
Motion of the bed usually will be interlocked with a skewing of the rollers, so that the bed will advance the material on one side one notch automatically as soon as a bar is delivered into one of the troughs. When it is desired to advance the material the motor is started, either automatically or manually, and the shaft makes one-half revolution, then is automatically stopped. Each set of moving supports moves through one-half of the elliptical orbit and stops, one set moving below the fixed supports toward the central runout, while the other moves above the fixed supports and away from the runout.

Thus, as one side of the bed returns to a position from which it can pick up the bars, the pieces on the other side of the bed are being carried one notch farther from the runout. The bed can be designed so as to deposit the bars directly into the grooves of the fixed supports, or to one side, from where they will slide into the groove.

The magnetic shear table consists of magnetic rollers placed on 30 to 40-ft. centers, with idlers located as



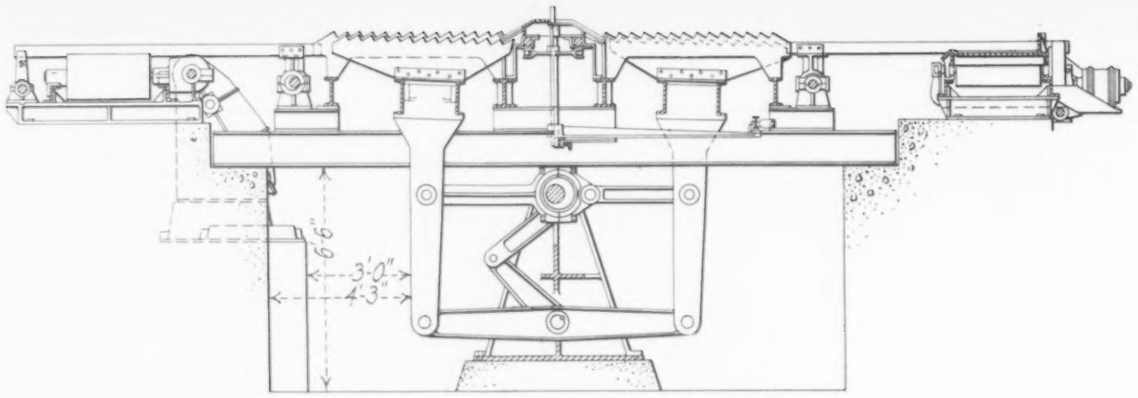
MAGNETIC Roller for Table to Handle Welded Pipe (at Right)



Sections of the Magnetic-Roller Table, with Idler Intermediate Rollers

Above the central point of the motor rollers that form the runout is a guide, against which the bar is held by a slight skewing of the rollers, as the material runs down the runout. After the piece is in the proper position for discharge from the runout the angularity of the rollers is reversed, causing the discharge of the piece from the rollers on to the bed. This reversal draws against the central guide the next succeeding piece that is delivered on to the opposite side of the central guide.

An advantage claimed for this central runout construction is that there is very little off-lead, the paths of the pieces on the two sides of the central guide being only a few inches apart. The use of the skewed rollers to cause a slight pressure of the material against the guide tends to straighten the bar and to eliminate any possible



Central Guide for Runout Shows at Center of Top, the Roller Immediately Beneath It Being of the Skewed Type. Table is arranged at left end with standard line-shaft drive. At right end is shown the alternate design, involving magnetic and idler rollers for the magnetic shear table

required between the live rollers. A cross-section of this table is shown at the right side of the bed in the sectional view, the table on the left being of standard line-shaft construction. The magnetic rollers have fixed magnets positioned within non-magnetic cylindrical shells.

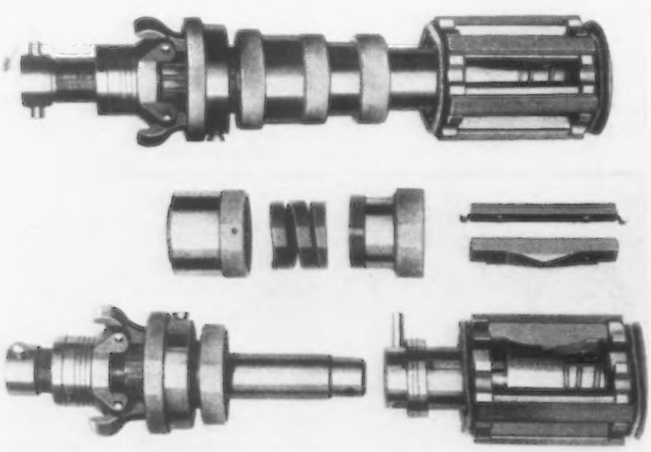
Cylinder Hone Arranged to Expand Automatically

HIGH production and close accuracy are claimed for the cylinder hone here illustrated, which has been put out by the Micromatic Hone Corporation, 5057 Woodward Avenue, Detroit. A feature is the automatic expanding head mechanism, which eliminates the hand expanding operation.

This tool is of single-cone type and has one central supporting point for the stone holders, which permits individual compensation for uneven wear. The cone is of a determined angle (beyond the angle of reversibility) which maintains positive expansion, assuring straight and round holes. The stones are mounted in light metal stampings.

A hardened and ground bushing mounted directly above the cylinder bore operates the expansion mechanism; it controls size and acts as a guide for the hone while entering and leaving the cylinder bore. Expanding fingers, when entering the bushing, expand the abrasive members automatically to a predetermined size. The abrasive members are then rotated and reciprocated in the cylinder bore for a given number of strokes, and when the operation is completed, a throw-out attachment on the machine raises the honing tools out of the cylinder automatically. As the expanding fingers leave the bushing the abrasive members automatically collapse, leaving the tools in position to enter the next bore. The compression spring cushions the pressure of the stones against the cylinder wall, eliminating stone breakage, and is caged to limit the expansion to a predetermined size.

For plants having comparatively small production, which is divided between bores of different sizes, a brake-type tool designated as the model B can be supplied. With this tool interchangeable hone bodies of various sizes are used with one brake head tool, investment being thus kept at a minimum. This hone may be used for either single or multiple operation, and the stones are interchangeable with those of the model A tool. The model B has a positive screw expansion with micrometer set and stop. The simple push-button adjustment can be regulated to an expansion of 0.0005 in., which assures accurate work and permits quick setting.



The Head Expanding Mechanism Eliminates the Hand Operation

Elkonite Tips for Etchograph Marking Pencils

ELKONITE marking points, which are said to eliminate the frequent dressing and replacement necessary with copper points and to permit clearer and deeper marking, are being offered by the William Brewster Co., 50 Church Street, New York, for use with its Etchograph electric marking machines. These points mark a sharp, deep line, and may be used on oily and greasy surfaces. Their life is said to be from 15 to 20 times that of the copper tips, the points being used in some cases for more than a month without resharpening.

The company has also brought out an "Etchograph Junior" machine which is the same as the larger equipment except that it has only two marking heats and is not intended for heavy work. Both machines may be used for marking iron, steel, stellite and tungsten carbide, the larger unit, with six heats, being adapted for marking a wide range of work, from light pieces, such as razor blades and feeler gages, up to heavy pieces, such as gears and shafts. This marking is done without any preparation, except connecting the machine to the lighting circuit. The machines are furnished for connection to a 110 or 220-volt 60-cycle single-phase a.c. circuit, but can be furnished for current of other frequencies. If 110 or 220 volts d.c. current only is available, a d.c. to a.c. rotary converter can be used.

New Horizontal Chucking Machine

Six-Spindle Unit May Be Set Up for Several Operations on One Piece or for Work Requiring Two Chuckings

FOR high-production chucking work up to 7 in. in diameter requiring a number of separate operations, such as turning, chamfering, forming, drilling, boring, reaming and threading, the Baird Machine Co., Bridgeport, Conn., has brought out the six-spindle horizontal chucking machine here pictured.

Simple tooling is a feature, and low maintenance cost is attributed to fully-inclosed flood-lubricated mechanism and Timken roller spindle bearings. In addition to a multiplicity of different operations on one piece, the machine is adapted for work requiring two chuckings, such as roughing and semi-finishing operations on gear blanks and other pieces. In this case the turret is indexed a distance of two spindles for each cycle.

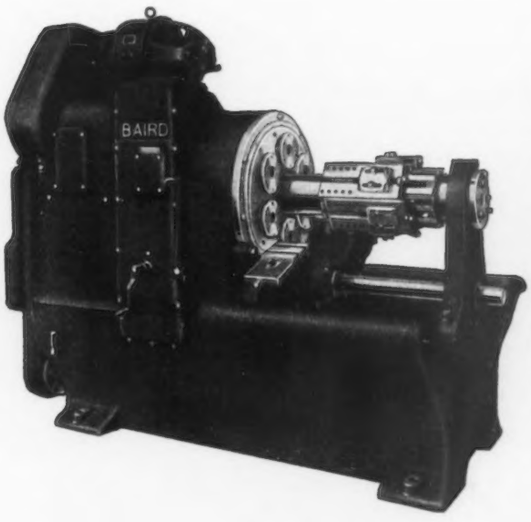
Parts and mechanisms common to all adaptations of the machine are the bed, containing the coolant and lubricating oil sumps and force feed pumps; the head, containing the turret; spindles and their clutches; the turret indexing mechanism and its driving spindle; the camshaft and cam drum, and the driving mechanism. Spindle and driving gears and the longitudinal feed cams are furnished to suit particular speed and feed requirements.

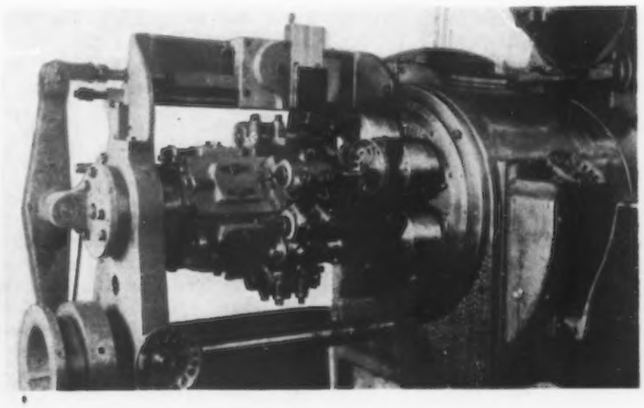
There are five longitudinal tool slides, three transverse or facing, and combination longitudinal and transverse tool slides. A large number of attachments, for drilling, angular or irregular turning, recessing, tapping, threading, drill speeding, etc., can be furnished. The chucks or work-holding fixtures may be either hand or mechanically operated, the latter being by means of a cam, lever and rod arrangement. A "work locator," operated by a foot treadle, has been designed for locating and holding the work until the chuck jaws take hold. Control levers, including cranks for turning the mechanism by hand, are provided at both front and rear of the machine.

With a pulley speed of 800 r.p.m., spindle speeds ranging from 19 to 800 r.p.m. are obtainable through a minimum number of change gears. The spindles may be run at varying speeds in relation to one another, and any spindle can be held stationary for cross drilling, longitudinal drilling of several holes, drilling off-center, or for milling. The driving spindles are in alinement with the work spindles when in the working position but are disengaged when indexing. A feature claimed for the driving mechanism is that it does not set up side strains on the work spindles or turret.

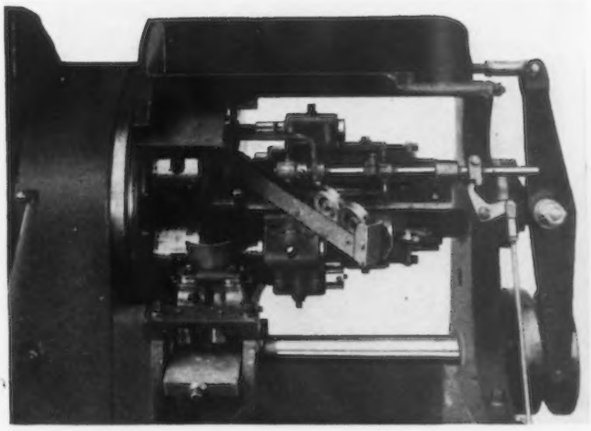
Turret indexing is smooth and is accomplished by means of an improved Geneva motion and 60-deg. movement of the camshaft. Indexing, as well as for tool return, is at high speed, and the rate of indexing remains the same regardless of spindle speeds or tool feeds. The turret is locked by means of a hardened steel bolt.

All tool-slides are adjustable and have a graduated dial for close setting. Two rates of feed are obtainable from the large cam drum at the head end of the machine, and a third rate of feed may be had by use of a reducing motion attachment, which is made up of a slotted lever and rod,

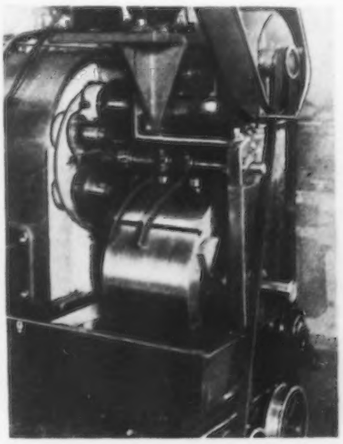




THE Machine Is Designed for High Production of a Wide Variety of Work. Several of the different types of tool-heads and tool-holders that can be used are shown in the close-up view above; the arrangement of the tool feed cam drum is shown at the right, below



SET-UP for Finishing Cast Iron Automobile Generator Pulleys Is Shown at Left. The extra length hub that permits chucking is cut off at the last operation, and a magazine catches the finished pulleys as they drop from the chuck. The front cross-slide is provided with a "generating motion," and a vertical cross-slide with form tool is employed. A work locator is also used



the latter having connection with the cam on the drum and the longitudinal slide in which the tools affected are carried.

Two of the three cross tool-slides are located below and one, a vertical slide, above the spindles. They are intended for turning and facing operations at the first, third and fifth working stations respectively. The lower slides are actuated by cams shaped to suit the particular job, and may be furnished with a "generating motion," by means of which roughing tools are advanced for angular facing of such surfaces as the vee in cast iron pulleys. The vertical cross tool-slide is mounted in a bracket that extends from the head of the machine to the tail support, and is operated by a rack and pinion. The rack receives its motion from a horizontal rod, lever and cam arrangement, the cam being mounted on the main camshaft outside of the tail support of the machine. The combination slides provide tool motion at right angles to the regular motion, and are used for making recess cuts inside of a hole, or facing the inside end of a piece. A combination slide arranged to permit using a reamer at the center of the work has also been devised. Holders and operating mechanisms can be furnished for self-opening dies or collapsible taps, as well as a backing-off mechanism for solid taps and dies.

The chip pan is large and has an overhanging lip under which a barrow or other conveyance may be placed to facilitate removal of chips. A dust hood for connection to an exhaust system can be provided. The initial drive may be by belt or motor, a 7½-hp. motor being recommended. Floor space occupied by the machine is 54 x 92 in. The net weight is approximately 12,000 lb.

Cold Saw Equipped with Oilgear Hydraulic Feed

FLEXIBILITY of feed range, rapid traverse in both directions, and simplification of feed drive are features of the Newton cold saw cutting-off machine with Oilgear hydraulic feed, brought out recently by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. Ten sizes of the machine, with capacity for cutting rounds from 5¼ to 25¾ in. in diameter, and other sections in proportion, are built.

For the feed, a type QSA Oilgear feed and rapid traverse pump, driven by a separate motor through Texrope or silent chain at the rear of the machine, is employed. Oil under pressure is carried through piping to a cylinder bolted to the rear end of the base. The piston-rod of this unit is anchored in the spindle saddle in line with the saw blade, bringing the feed pressure in line with the cut. Any variation in feed from 0 to 23 in. per min. is readily obtainable, as well as quick traverse in both directions at the rate of 90 in. per min. The feed and rapid traverse lever is located conveniently at the front of the work table. Adjustable stops are provided for controlling the length of feed travel and the automatic quick return, making the machine semi-automatic in operation. With one movement of the single lever, the machine completes the cutting cycle, the saw carriage stopping at its original position.

In addition to flexible feed range, the hydraulic carriage drive provides even and smooth cutting; the oil, acting somewhat as a cushion, equalizes the feed pressure for cutting through hard spots. The condition of the saw blade may be checked, a dullness of the blade being shown by the building up of working pressure on the gage. The hydraulic feed also makes possible the elimination of feed shafts, gears, reversing clutches, feed worms and wheels, and their lubrication problems.

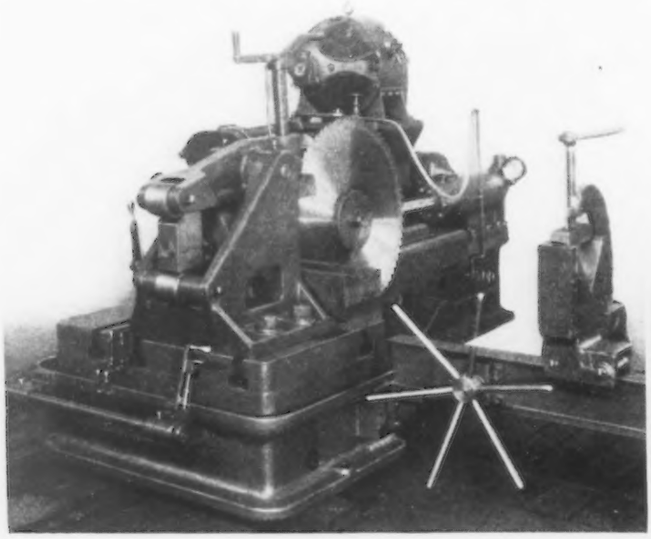
Another feature of the machine is that the saw blade cuts up, so that the thrust of the saw carriage is directly down on the base. This, together with the hydraulic feed, is stressed as markedly increasing the productive possibilities of the machine.

Direct-Connected Motor Drive

The spindle drive is by means of a direct-connected constant-speed or a variable-speed motor, which is mounted on top of a bracket directly on the spindle saddle, and pick-off gears. From this point the drive is through a hardened steel worm which meshes with a large phosphor bronze worm wheel on the pinion shaft, which has herringbone teeth cut from the solid. This pinion meshes with a large herringbone gear which is also integral with the spindle.

Except for the spindle, anti-friction bearings are used throughout the drive. All bearings on the machine are lubricated from a centralized oiling system, a Farval type lubricator supplying oil under pressure to each bearing. Extra equipment includes special holding chucks, air clamps or hydraulic clamps. The hydraulically operated clamp is piped to the Oilgear pump, making the machine entirely self-contained. Stock feed trolleys can be furnished so that bars 20 ft. or longer can be fed into the cutting position. These stock trolleys are hand adjustable by means of a pilot wheel either on the trolley saddle or located at the operator's position.

In demonstrating the machine at the recent Machine Tool Show, 9½-in. diameter S. A. E. 1040 steel bars were cut in 3½ min. Specifications for the largest and smallest machines respectively are: Diameter of saw blade, 20 in. and 90 in.; length of feed, 7⅞ in. and 48 in.; size of work table, 14 x 22¼ in. and 60 x 88 in.; and driving motor, 5 hp. and 50 hp.



HYDRAULIC Clamps Operated by the Oilgear Pump May Be Used. S.A.E. 1040 9½-in. steel bars are cut in 3½ min.

Open-Hearth Men Meet in Chicago

Practical Steel-Making Problems Taken Up In Two Days of Technical Sessions—Visit Laclede Steel Co.

PROGRAM for the autumn meeting of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers, at the Hotel Stevens, Chicago, Nov. 5 and 6, follows. As has been the case for some years at these semi-annual meetings, no set papers were prepared. Instead, definite topics for open discussion were arranged for, covering four half-day sessions, and members were asked, in advance, to be prepared to talk on specified items.

For Tuesday morning, open-hearth mechanical equipment was the general topic. Pugh ladles vs. metal mixers, automatic couplers on stock buggies, automatic tongs for handling molds and ingots, best size of mold for large slab ingots to avoid excessive segregation in rimming steel, and furnace control equipment were the specific subjects.

Reports of standing committees had the floor at the beginning of the afternoon session; committees on combustion, furnace design, refractories, organization, quality control—rimming steel and killed steel separately—steel melting, pouring practice, combustion control and auxiliary equipment being on the schedule.

Fuels constituted the major topic of the Tuesday afternoon session, the discussion going into relative B.t.u. consumption of various fuels for each ton of ingots, methods of metering fuels, limiting factors in use of low-grade fuels and several items relating to control of melting and refining conditions.

Furnace design was considered on Wednesday morning. Specific topics included insulation of furnace bottoms and checker chambers, dampers, soaking pits, Venturi ports and inclined port roofs. Design of a standard furnace to burn a specified fuel most economically was the closing item for this session.

Operations and quality control were two general subjects scheduled for the last session. Drying ladles and stopper rods, checker removal on rebuilding furnaces, handling basic slag (in the pit), ladle trunnions and cables, nozzles and corrugated vs. plain-wall molds were listed under the first head. Quality control included report on last six-months progress, by Dr. C. H. Herty, Jr., United States Bureau of Mines. Other topics were use of silicon-spiegeleisen, of aluminum and of ferro-manganese, handling of slags in the furnace, soaking-pit heating and blooming mill work, rolling of high-sulphur steel and of sheet bar steel, and heavy, loose scale on ingots as drawn for rolling.

On Wednesday evening a joint session was scheduled at the Chicago Engineers Club with the Chicago branch of the American Institute of Mining and Metallurgical Engineers.

Thursday the members of the committee are to be guests of the Laclede Steel Co. at its works in Alton, Ill. Here the chief point of immediate interest is a new 100-ton open-hearth furnace built and operated on the Stevens principle. This unit is said to be averaging below 30 gal. of fuel oil to the ton of ingots, melting a cold-metal charge.

Newport News to Build Two Dollar Line Ships

WASHINGTON, Nov. 4.—Two 20-knot combination passenger cargo vessels of about 33,000 tons displacement each will be built for the Dollar Steamship Line by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. Contracts covering construction loans of $5,287,500 for each of these large vessels have been signed by Chairman T. V. O'Connor of the Shipping Board, Vice-President H. M. Lorber of the Dollar company and President Homer L. Ferguson of the shipbuilding company. The vessels are to be engaged in the round-the-world service and will be the largest and most modern in that service. The first is to be ready for service by Oct. 1, 1931, and the second is to be completed by Feb. 1, 1932.

Contracts covering the loans recently awarded the Motor Tank Corporation of Philadelphia, to be used in aid of constructing five 11-knot Diesel tankers of about 18,900 tons displacement each, also have been signed. The loans aggregate $6,304,687. The vessels will be built by the Sun Shipbuilding & Drydock Co., Chester, Pa.

Triumph Electric Corporation, Cincinnati, manufacturer of electric motors, has appointed Garrett Burgess, Inc., 5050 Joy Road, Detroit, as sales representatives in the Detroit district.

A BRONZE plaque in honor of the late George W. Niedringhaus, pioneer steel manufacturer in the St. Louis industrial district, was unveiled on October 25 in the rotunda of the new city hall in Granite City, Ill., which he founded. The plaque, 4 x 5 ft. in size, is mounted on marble. It shows at the top a figure of a young worker against a background of factories and smoke, and below is a relief profile of Mr. Niedringhaus, and the words: "George W. Niedringhaus, 1864-1928. Pioneer and great leader. An employer of many whose personality won the hearts of his fellow men. Whose vision and energy built a city."

The plaque was designed by Victor S. Holm, of the Washington University School of Fine Arts, St. Louis, and is the gift of a group of Granite City citizens. A similar tablet was installed in the Granite City National Bank last July and others are to be placed in the Young Men's Christian Association and St. Elizabeth's Hospital.

The address presenting the plaque to the city was made by L. Warrington Baldwin, president of the Missouri Pacific Railway. Mayor M. E. Kirkpatrick, whose first job was in the steel mills, accepted it. Philip Stremmel, superintendent of the Granite City Steel Co. and for 40 years an employee of Mr. Niedringhaus, acted as chairman. The tablet was unveiled by Mrs. Nathaniel B. Randolph, youngest sister of Mr. Niedringhaus.

High-Production Hobbing Machine

Simplified Gearing and Drives, Anti-Friction Bearings and Hob Spindle Drive Outside of Bed Are Features

FOR roughing and finishing spur gears, spline shafts and similar forms on a manufacturing basis the Barber-Colman Co., Rockford, Ill., has brought out a new hobbing machine, designated as the type B.

Features include simplified gearing and drives, extensive use of ball and roller bearings, including Timken roller bearings on the hob and work spindles; worm-gear final drive to the hob; a hob spindle drive outside of the bed, permitting the hob to be swiveled on a center under the work; and a work-spindle housing mounted fast to the base, the work diameter being controlled by an elevating bed. Also, a unit pressure oiling system; automatic continuous lubrication of the feed box; hob slide power rapid traverse; centralized interlocking controls; use of hardened spiral bevel gears throughout; screw and micrometer dial for positioning the hob, and direct-connected motor drive.

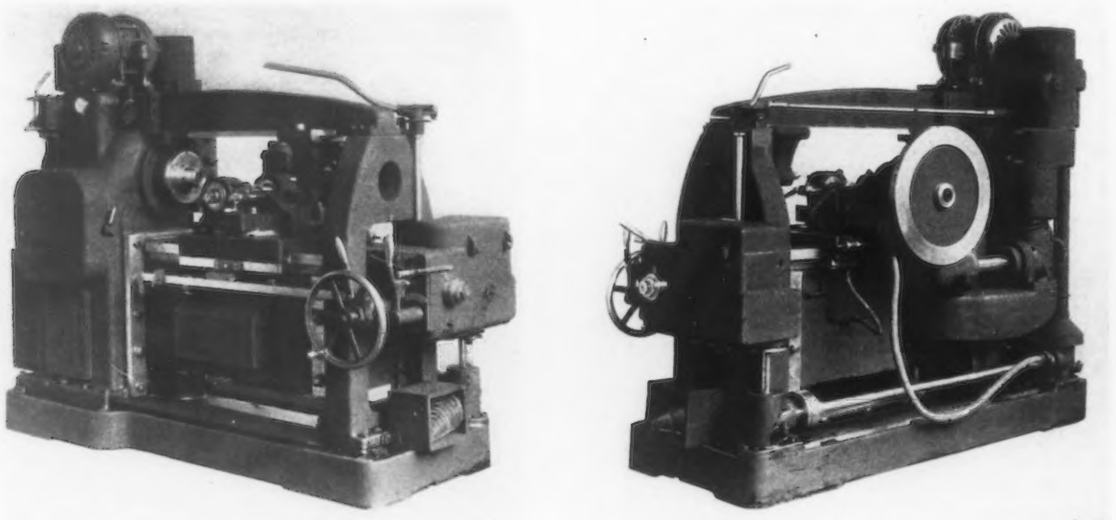
A departure from usual practice has been made in the framework and adjustment of the machine. At one end of the base casting, which serves also as an oil reservoir, is mounted the main upright which carries the driving and indexing elements, as well as the main work-spindle, as a complete unit. This upright is tied to the outer upright by a cast-iron overarm or bridge, as shown. The inner faces of both uprights are machined and form a parallel open-sided box in which the hob-carriage main bed is raised and lowered. This construction is intended to permit accurate adjustments for diameter of work and to provide unusual rigidity for production operations.

The front end of the standard work-spindle has a No. 12 B & S taper, but the hole through the spindle and the spindle face can be made to permit holding and driving a wide variety of work. The outer support for the work may be a center or a bushing sleeve, which is carried in an outer tail-center bracket that is adjustable along the overarm of the machine. Indexing of the work spindle is accomplished by a hardened steel worm and large diameter bronze-rimmed worm-gear.

The hob slide is accurately adjusted by means of a screw to position the hob endwise, and is then clamped in place. The drive to the hob-spindle is through worm gearing. It is desirable that the swivel for setting the proper angle of hob to work be approximately under the center of the hob, and this is accomplished by separating the worm-gear case and the bevel-gear case and joining them with a heavy swivel fit. With this arrangement, it is claimed that, regardless of the hob setting, the worm-gear case maintains its alinement with the hob spindle and the bevel-gear case with the man drive-shaft, the entire unit then being clamped to form a heavy hob swivel slide driven by a shaft outside of the bed ways.

Two elevating screws support the bed on which the hob carriage travels, and graduations are provided to permit adjusting the height of bed to 0.0005 in. The feed box is driven by an independent shaft that runs continuously. This shaft provides power through the feed change gears for any selected feed, or through the reversing gears for quick traverse of the hob slide in either direction, the feed and quick traverse movements being selective by a lever on the feed box. In addition to motor controls, an automatic stop on the machine operates a friction driving clutch located between the motor gears and the drive change-gears. All bevel gears are of spiral type.

Specifications include: Maximum and minimum center distance between work-spindle and hob, 8 in. and 2 in.; maximum travel of hob carriage, 16 in.; maximum diameter of hob, 4½ in.; feed, 0.081 to 10.72 in. per min.; range of the eight hob speeds, 55.1 to 159.4 r.p.m.; motor, 7½-hp., 1750 r.p.m.; and floor space occupied, 42 x 92½ in.



Work-Spindle Housing Is Mounted Fast to the Base, the Work Diameter Being Controlled by the Elevating Bed. The hob spindle drive is outside of the bed, but the hob may be swiveled on a center under the work

Data on "Battledeck Floors"

A technical bulletin describing the "battledeck floor" construction has just been issued by the American Institute of Steel Construction. This is a floor made of steel plates welded to I-beams. A few experimental floors of this type have been installed during the past year, and special automatic welders designed to handle the work. A demonstration of the proper method of construction will be staged at the convention of the institute at Biloxi, Miss., on Nov. 14. Complete engineering data on the floor is contained in the bulletin just issued.

Society Forms Division of Sales Engineers

A sales engineers' division of the Cleveland Engineering Society, Cleveland, has been organized with the following officers: Chairman, C. E. Hague, Dayton-Dowd Co.; vice-chairman, J. L. Finnicum, Allen-Bradley Co.; recorder, F. W. Kessler, Lincoln Electric Co.; member executive committee, G. L. Blomquist, Strom Ball Bearings Co. E. J. Lund was appointed to serve with the officers on the executive committee of the division.

This Issue in Brief

Stock market collapse will be followed by a period of hesitation and watchful waiting, machine tool industry expects. But the liquid and prosperous condition of industry is expected to act as a bulwark for a continuing satisfactory volume of business.—Page 1286.

* * *

Don't overburden the foreman with paper work or with anything else that takes much of his time away from his primary duty of supervising if you want low manufacturing costs. Allowing him time for efficient supervision will inevitably result in reduced scrap losses and greater shop economy in general.—Page 1234.

* * *

How many of the 13 major sources of waste are not receiving attention in your plant? A specialist in waste prevention lists these sources on Page 1239.

* * *

Merger movement is due in considerable measure to the development of electric power transmission, says National Industrial Conference Board. Individual motor drives have made possible the construction of infinitely larger factories. Another major factor is the increase in transportation facilities for industrial products.—Page 1241.

* * *

"Mental bondage to established custom" has so far prevented machine designers from taking full advantage of the technical freedom granted by electric power. The habit of restricting the application of power to one point of the machine is a heritage of older days.—Page 1230.

* * *

Even the small shop needs a superintendent. He can earn his salary many times over by relieving the owner of those duties which take his time away from company management problems.—Page 1234.

Strength of forgings repaired by thermit welding process is not limited to the strength of steel castings. Tests "to destruction" reveal that the fracture occurs as often completely outside the welded area as in the weld or adjacent to it.—Page 1232.

* * *

Better steel results from observation of physical characteristics of the slag specimens. Lustrous black slags are associated with low FeO content in basic open-hearth steels. Spider-webbed slag surface indicates high P_2O_5 content.—Page 1237.

* * *

For pickling, is hydrochloric superior to sulphuric acid? HCl etches more rapidly and more cleanly, but special containers are needed, and the vapors arising from the bath are harmful.—Page 1238.

* * *

Habit of saving replaced equipment for emergency use usually results in loss. Better get rid of the old equipment as quickly as you can. Experience shows that it is rarely put back into service in the plant in which it formerly served. It depreciates so much more in idleness that eventually no one wants it.—Page 1239.

* * *

Few machine designers are making use of the great flexibility of the electric motor. Power, ranging from 0.001 hp. to 10,000 hp. or higher, is available through a wide choice of speeds, without the intervention of mechanical means.—Page 1230.

* * *

You can predict very closely the phosphorous content of molten open-hearth steel by observing the color of a sample of solidified slag (crushed). Many a heat of steel has been tapped out by slag color in contradiction to preliminary results from the floor laboratory.—Page 1238.

Your supply stocks cost you 25 per cent of their value each year for maintenance. At least that is the average figure revealed by a survey. The major portions of this 25 per cent are interest 6 per cent, depreciation 5 per cent and obsolescence 10 per cent.—Page 1240.

* * *

Emergency spare equipment is often a costly luxury. Caution in procuring spares is suggested, now that welding makes quick repairs possible, and with the trend toward heavier and improved equipment.—Page 1240.

* * *

Phenomenal gains in scrap exports are due partly to trade restrictions on scrap exports in some foreign countries. Another factor is the increase in proportion of scrap charged. Outside of Canada, Italy and Poland are our largest customers.—Page 1245.

* * *

Failures in thermit welds are due more to inadequate preheating than to any other cause. The joint should be uniformly and deeply heated to a high temperature with a reducing flame.—Page 1233.

* * *

Pig iron output sets new October record. Daily average production was 115,745 gross tons, which was ¾ of 1 per cent under September. On Nov. 1 there were 203 furnaces in blast, a net loss of two for the month.—Page 1258.

* * *

Correction of the speculative orgy will have some adverse effect on business. The degree will depend largely upon industrial behavior yet to come. If producers refuse to recognize that anything has happened and continue to produce carelessly they may quickly begin to build up inventories.—Page 1254.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Hopeful Disillusionment

IN commenting last week upon the successive crashes in the stock market, THE IRON AGE suggested that the wholesale and at times frantic dumping of securities was out of keeping with the very moderate slackening in business that had come in September and October. The highest authorities, including the experienced and erudite President of the United States, agree that business conditions are now good. Are they going to continue good? Nobody is now looking at the stock market as a barometer. We are thinking of it as a prime mover and of its débris possibly becoming grit in our machinery. Let us therefore review what fundamentally has happened.

We started with certain physical assets, represented largely by certificates of corporate stock. We have added to those assets and represented the addition by more stock. On the whole those additions have been well conceived. We do not think of any major miscalculation, implying loss or lock-up of capital and long delayed realization of earnings. So far so good. We then proceeded to write up the value of all this property through its paper and now we have written it down again. These processes have been attended by great changes in personal ownership, and by much change of status from that of mortgagees to partners, but fundamentally there has been neither gain nor loss. Elementally it would have been merely a bookkeeping record of rise and fall. There are many conservative individuals whose affairs find themselves in precisely that position.

There have been, however, disturbing interventions. In the first place the Federal and State governments have abstracted a large slice in their taxes computed on an inflated basis. Some persons holding stock A at $100 and selling it at $200 and buying stock B at $200 now find themselves with stock B at $100 and are out 12.5 per cent of $100 that they handed over to the Federal tax gatherer. The executors of persons who have died during the last three years have paid inheritance taxes on inflated valuations. Besides giving the tax-gatherer his cut, some persons who have realized profits on the rise have bought automobiles, jewelry, furs and other unproductive goods, not to speak of purchases from bootleggers and expenditures in night clubs that represent immediate consumption, even profligacy. Such events may follow not merely from realization, but also from the borrowing of credit against securities at inflated value. Margin calls by brokers are not the only thing that may force selling in a declining market. There are men who can read this recital and reflect that all of these things have happened in their own experience during the last two years.

It is evident, therefore, that all of the national savings that are made during a bull speculative period do not go into new capital goods and that there is an increased diversion of them via the tax-gatherer, the purveyor of amusements, etc., into consumption goods; all of which makes for activity in business, but in ways that are bound to wither when winter comes. Therefore it is idle to argue that the correction of the speculative orgy will not have some adverse effect upon business. The only question is how bad will be its effect.

The last is something that no one can foretell, for it will depend largely upon industrial behavior yet to come. In any event we should not naturally look for anything more than one of the minor depressions that result from the accumulation of unsold stocks of goods. But if producers refuse to recognize that anything has happened and continue to output carelessly they may quickly begin to build up inventories. If on the other hand they be cautious and aim to adjust themselves in advance to a curtailed consumptive demand they will save themselves much worry later on.

A no inconsiderable factor in our present situation is the psychological; in many respects, one of which is the attitude of labor. The mass of industrial workers had imbibed the notion that we were in an era in which money had become easy to get; and even if they did not try to play the stock market they had thought the time opportune to insist on advances in wages. If the idea can be made to seep into the halls of the labor unions that everybody else has awakened from a great illusion, and if it can be made easier to build houses and other things, there will be an improved demand for materials that will be a substantial amelioration.

Manufacturers who have been under such pressure to produce that they have postponed plant changes or given less than due thought to new economies should now be in position to use some of their working force in other than regular production lines. In such ways unemployment will be minimized and the interval before the resumption of full prosperity materially shortened.

Steel Prices Did Not Advance

DURING this 1929 period of exceptionally heavy demand for steel, taxing for a time the mill capacity and throwing deliveries behindhand, steel prices did not advance. It is well to state this fact definitely for men are prone to assume that steel did what might be expected of it. At this time it is of no great moment to consider why prices did not advance. The mills were indisposed to press their advantage as they wanted stability above all things.

What prices did in the last two years—and we are of course simply considering the market as a whole, represented by THE IRON AGE'S finished steel composite—was to cease declining as they had been doing for years preceding. Our composite stood last week at 2.362 cents per pound of products representing seven-eighths of the total steel output. The low for many years came on Oct. 25, 1927, at 2.293 cents. There is an advance from that point of $1.38 per net ton, but a low is not an average. There had been a long period of declining prices, as shown by the following annual averages of our composite, in cents per pound:

1923	2.738
1924	2.609
1925	2.465
1926	2.439
1927	2.357
Average	2.522

With some slight declines in the past few months last week's level was just at the average of 1927, the low year in many years. The mills have not been able to make much reduction in costs in the last two years, relative to reductions in previous years. Their recent large earnings have been due to high operating rates, distributing overhead in an industry so highly mechanized that with full operation the last 10 or 20 per cent of output adds but little to total cost. With a lighter operation unit costs increase and mills should not be expected to make the matter worse by cutting prices.

Steel Corporation-Columbia Deal

TWENTY-TWO years, almost to a day, after its purchase of the Tennessee Coal, Iron & Railroad Co., in the midst of the panic of 1907, the United States Steel Corporation announces that it has bought the assets of the Columbia Steel Corporation, the leading producer of steel on the Pacific Coast. Back in 1907 it was estimated that the Steel Corporation owned close to 60 per cent of the steel-making capacity of the country and that the Tennessee company purchase increased this by about 4 per cent. By the official statistics for 1928 the Steel Corporation produced 39.1 per cent of the country's output of steel ingots and castings last year, showing a marked downward change in its relation to the independent companies in the 22 years. Also by contrast with the transaction of 1907, the acquisition of the Columbia Steel Corporation properties adds scarcely 1½ per cent to the steel-making capacity of the leading interest, putting the latter at about 24,000,000 gross tons of ingots at the close of 1928.

In its comment on the Tennessee company purchase of 22 years ago THE IRON AGE observed that in spite of all that was said about the 700,000,000 tons of ore in the ground and the 2,000,000,000 tons of coal, any success the Steel Corporation might have in its future operations in Alabama would be largely due to what it carried southward in its own hands—to the money, the experience, the talent and the organization which it brought to the attack of the problem of steel making in the South. Much the same is now to be said of the corporation's future as a producer of steel on the Pacific Coast.

There will be different opinions in the steel trade on the question whether buyer or seller gained the more by the transaction just concluded. It is fair to say that neither the Steel Corporation nor any leading independent producer of steel has been looking with covetous eyes on any Pacific Coast steel property. It would appear that the bankers and other leading investors in the securities of the Columbia company were sooner and better convinced of the desirability of selling to the Steel Corporation than was the latter of the desirability of buying. They had found, as had those who owned the Tennessee company properties in the 20 years before the Steel Corporation regime, that steel manufacture is fairly insatiate in its demands upon capital. Creditable as the expansion of the industry on the Pacific Coast has been, and excellent as the condition of the leading plants, only a beginning has been made, and to cope with what is ahead may well call for greater resources than have yet been brought to bear on the problem.

No doubt the Steel Corporation judged that it stood to benefit by identifying itself with the future development of the Pacific Coast. That factor has probably counted for more in the recent negotiation than did the hope of Southern buying of Alabama steel in the deal of 1907. The completion of the Boulder Dam, the coming prosperity of the Imperial Valley, and the millions to be added to the Pacific Coast's population in the next decade are an alluring prospect.

Steel works operation under the even climatic conditions of the western coast also has some advantages, in escaping the costly mid-winter handicaps at most of the country's steel-making centers and the mid-summer limitations of the same districts. In respect to labor conditions, Pacific Coast steel makers have for some years been free from such union restrictions and militant methods as from time to time have plagued other industries there.

With the large and growing consumption of tin plate in the coast States it is to be expected that that product will have special consideration in the future extensions to which reference is made in the Steel Corporation's announcement of the Columbia purchase. Counting in Canada, not far from 400,000 tons of tin plate a year is now represented in the annual pack of food products on the Pacific Coast.

Employment in Consuming Steel

THERE is a complete reversal of conditions of 20 or 30 years ago in the relative amounts of labor involved in making and consuming steel. In the old days we heard much about possible labor shortage in the steel industry when demand was heavy, and much about unemployment when demand was light. In a time of rising steel demand it required some courage to suggest that perhaps if there were a labor shortage it would restrict the consumption of steel as much as the production. Comments made on the state of general business paid much attention to employment in the making of steel as if steel once made and shipped from the mill passed immediately into ultimate consumption without any further work being involved.

Now we have a complete reversal. The iron and steel industry has become highly mechanized and employs much less labor per ton of output. Even in the exceptional case, the rolling of sheets and black plates for tinning, still done by hand, outputs per man are

very considerably increased. Blast furnaces employ relatively little labor and there are large rolling mills with widely varying output from time to time but practically the same labor employment.

It might be countered that the consumers of steel have also introduced mechanization. True, for the same operations, but the operations are different. Probably freight cars are built with considerably fewer men per car than 20 years and more ago but we are not building as many freight cars although making much more steel. Even in the old days there was not much labor per ton in making freight cars. It requires little labor to lay rails but we are making scarcely as many rails as 20 years and more ago. In fabricating and erecting steel there may be less labor per ton than formerly but there never was much and the character of buildings erected nowadays requires much more labor for the other work.

The doubling in steel tonnage in 20 years has been largely along the line of steel being employed in smaller forms, where much more labor per ton is required to work up the mill product into the final thing for actual consumption. Witness the fact that sheet production has quadrupled in 20 years while the strip has risen from nothing to an item of more than two million gross tons. In the same time seamless tubing has risen from less than a hundred thousand to more than a million tons.

It is true that these light steel mill products which have grown so greatly go largely into apparently automatic machinery; but then there is the machinery itself, the building of which must be taken into account. We build a great deal more machinery than formerly and employ much labor in doing so, relative to the amount of steel consumed in making the machinery.

For the automobile industry figures are presented in the annual handbook of the trade, setting forth 1928 employment in automobile plants at 402,138 and in parts and accessory factories (not including tire factories) at 200,000, making, say, 600,000 workers, while according to the finding of THE IRON AGE 18 per cent of the steel made in 1928 went to the industry.

Putting Waste to Use

MORE and more of a factor in recent years in cutting manufacturing costs in the United States has been the use of what previously was waste material. It is not alone that a thing once called waste is now made useful, but the old-time expense of getting rid of it is entirely obviated. Long familiar in the iron industry is the turning of blast furnace slag into cement. Then we have had the conversion of crushed sugar-cane stalks (bagasse) into insulating material for buildings, as is done in the South; the making of refractories from broken firebrick, etc. Toy manufacturers use sheet steel scrap from automobile body plants. Among prepared shingle roofings a new product is surfaced by crushing the waste taken from coal mine dumps.

One of the most recent examples of salvage has been the putting of fine abrasive dust into useful employment in the building industry. This dust is mixed with marble flakes, concrete, terrazzo composition and other materials, is molded into tiles or such other shapes as may be required and, after being properly fired, is ground to final condition. The hard, abrasive particles resist both slipping and wear.

At first it was thought that preventing a floor or stair from becoming slippery, thus promoting safety, was the important factor in the new product. As is often the case, however, in practice it was found that the most useful quality was something else. This is its resistance to wear and its consequently greater durability, compared with some other materials.

Cost reduction through multiplying machine power behind the worker may often have more incentive and be more spectacular than preventing waste or turning it into a by-product. But the latter has the merit of being frequently attained by relatively small outlay and of enlisting more minds in its pursuit than do intricate problems of mass production.

CORRESPONDENCE

Cost Factors in Diesel Engine Plant

To the Editor: In your issue of Oct. 10, there was an article on a Diesel equipped plant by Edgar J. Kates, consulting engineer, New York.

It seems to me there were one or two important factors omitted from this article—the interest on the investment and the depreciation. These two facts we would like to learn about, and hope you may procure this information.

J. B. CLAY,
President, Clay Equipment Co.

Cedar Rapids, Iowa.

To the Editor: The cost of the 160-kw. Diesel power plant installed under my supervision at the plant of the Vulcan Rail & Construction Co., completely installed, was $24,000. Instead of including estimates of interest on investment and depreciation, a simpler and quite common method of presenting the facts was adopted in my article.

The actual outlays for operating the private power plant for 17 months were $1,513.77, while purchased current would have cost $8,065.29 for the same amount of power. This is an average saving in cash outlay of $385 per month, which if applied to paying off the initial investment will amortize it in less than six years. After the investment has been paid off, the $385 per month will be net profit, at the rate of over 19 per cent on the original capital.

If the other system of accounting is preferred, i. e., to assume fixed charges and include them in the current costs, these charges may be figured as follows:

Interest on initial investment	6.00 per cent
Depreciation, based on 20 year life and depreciation fund earning 6 per cent interest	2.72
Taxes and insurance, say,	1.28
Total fixed charges	10.00 per cent

These fixed charges amount to $200.00 per month. For the 7 months ended July 31, 1929, the generating cost averaged $153.41 per month, thus making an overall cost of Diesel power of $353.41 per month as compared with $489.67 for purchased current. When the load on the plant increases the saving will become still larger, as the cost of the additional power will be merely that of the extra fuel oil, which is only 0.63 c. a kwhr.

EDGAR J. KATES.

570 Seventh Avenue, New York

A Confident View of the Future in Steel

A Pennsylvania steel company sent the following telegram to its sales offices and sales representatives last week, following the stock market crash of Oct. 29. Its tenor is representative of the confident spirit in which the steel industry faces the business developments of the weeks just ahead:

"The trip home from a fool's paradise has been a hurried one and return tickets will only be given those failing to concentrate on their jobs. Work hard and rely on the great natural resources and the growth of the country and the common sense of the American people. We may be facing some temporary let-down in business, and the only way to minimize this effect is to redouble your efforts to secure sufficient tonnage to keep us running to a profitable capacity. You have back of you a company with low costs, no funded debt and an organization whose entire energies are devoted to the production and distribution of high grade products. You will find this an asset in securing orders, as the reduction of inventories and quick deliveries for emergency jobs will intensify the need for quick service, and we are here to serve. Do not waste your energy and typewriter ribbon writing us hard luck stories of work suspended and stock market losses. We can match these with experiences of conservative investors refusing to be stampeded and a list of impending projects for new building and expansion that will far outweigh the temporary effect of the financial debauch."

Micromatic Hone Company Organized

The Micromatic Hone Corporation, recently organized to take over the Jeschke Tool Corporation, will maintain offices at 5057 Woodward Avenue and plant at 14220 Mack Avenue, Detroit. The reorganization was brought about through the H. W. Holmes Corporation, Detroit, industrial engineers, which owns and operates the Detroit Machine Tool Co. and other companies.

Officers of the Micromatic corporation are: K. W. Connor, president and general manager; H. W. Holmes, vice-president in charge of engineering; R. M. McGuire, sales manager; F. M. Kern, factory manager; R. E. Allport, director of purchases, and G. E. Eyestone, treasurer. These officers, together with H. A. G. Jeschke, comprise the board of directors. Development and field engineering work will be headed by Frank Jeschke and G. M. Calvert.

The Week in Business

Drift of Current Financial and Economic Opinion

"A BIG blister has burst on the skin of America. It looks uglier than an internal ulcer but is not nearly so dangerous," says the Manchester (England) *Guardian* in commenting on the recent collapse of the New York Stock Market.

This view emphasizes the superficial character of the crash, in contrast with previous major Wall Street crises, when readjustment was more sweeping, affecting industry and trade with the same force with which it shook the securities market. Moreover, deflation of the speculative boom, in the opinion of leading analysts, was necessary to relieve business of the burden of tight money. "Most experienced people," writes Alexander D. Noyes, New York *Times*, "believe that continuance of prosperity was in the long run best guaranteed by the bursting of the Wall Street bubble."

"One thing is assured—namely that no scarcity of funds for the industrial and commercial world will now ensue," asserts Bache *Review*. Brokers' loans shrunk $1,096,000,000 last week, while the New York Federal Reserve Bank cut its rediscount rate from 6 per cent to 5 per cent and rate reductions were announced by the Bank of England and other central banks in Europe.

Immediate Effect on Business

But the first effect of the market break on business is likely to be adverse, in the opinion of the Alexander Hamilton Institute. "A sound banking situation and the prospect of easier money will not, of itself, bring about a revival of business, but its normal effect is to contribute to a more speedy recuperation than would otherwise be likely."

The Institute agrees with other commentators that commodity prices are not inflated, but believes that inventories, although presenting no such problem as in 1921, are larger in some lines than is generally realized. Even without this possible factor the psychological effect of the securities crash on business will probably be increased hesitancy and caution, leading to closer than normal buying.

The extent that the buying power of the public has been reduced by stock market losses is an unanswered question. Dr. Julius Klein, Assistant Secretary of Commerce, estimates that speculative accounts numbered about a million and that these would involve less than 4 per cent of all the families of the nation.

Reduction in Buying Power Exaggerated

It is pointed out also that in many cases only paper losses were sustained. A further consideration is that the securities values wiped out did not represent anything like the same reduction in the demand for goods. When speculative profits were taken, during the late boom, they were frequently shifted to some other form of investment, according to the Hamilton Institute.

The sharp recovery of the stock market on Oct. 30 and Oct. 31 also indicates that the impairment of consumer purchasing power should not be overestimated. The wild rush to sell on Oct. 28 and Oct. 29 deflated securities 20 to 30 billion dollars, but 80 to 90 per cent of the losses were made up in the succeeding two days, the New York *Herald Tribune* points out.

Federal Reserve Turned Tide

The turn in the market is generally ascribed to purchases by a banking pool and to reassuring public statements by John D. Rockefeller and others; but Norman Merriman, economist, Ungerleider Financial Corporation, declares that the main factor in stemming the decline was the release by the Federal Reserve banks of the largest amount of credit ever to set free in one week in the history of the Reserve system ($312,000,000). This was reflected in a reduction in margins required on brokerage loans to 25 per cent, from a previous minimum of 40 to 60 per cent. Speculators who were about to throw their stocks overboard found their margins adequate. Prospective buyers were chase securities.

"All told," Mr. Merriman asserts, "it was merely the freeing of credit on a large scale which prevented the disastrous break from becoming the most severe panic in financial history."

A Record October in Iron Output

Daily Rate Less Than September by ¾ Per Cent or 840 Tons—Ten Months' Total 6 Per Cent Over Next Largest—Net Loss of Two Furnaces

WITH actual production reported from all operating furnaces, the October coke pig iron output declined less than one per cent from the revised data for September. Because of errors in estimates and transmission on Oct. 1, September production was revised upward. The October production was a new total for that month and for 10 months a new high was attained.

Output in October was at the rate of 115,745 gross tons per day, a decline of 840 tons or 0.72 per cent from the September rate of 116,585 tons per day. The nearest approach to this for the same month was 113,189 tons per day in October, 1916. The October daily rate was the smallest since March, this year, when it was 114,507 tons. In October, 1928, the daily rate was 108,832 tons.

Operating Rate on Nov. 1

Evidently there was a sharp decline in the operating rate of the furnaces active on Nov. 1. The 203 furnaces blowing on that day had an estimated operating rate of 113,600 tons daily compared with 116,405 tons per day for the 205 furnaces blowing on Oct. 1. The large difference for a loss of only two furnaces is

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	121,151
Sept.	90,873	104,543	92,498	102,077	116,585
Oct.	97,528	107,553	89,810	108,832	115,745
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

**Pig Iron Production by Districts, Gross Tons*

	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)	July (31 days)
New York and Mass.	243,702	235,317	253,889	256,697
Lehigh Valley	84,676	82,623	88,395	95,571
Schuylkill Valley	75,303	69,373	74,871	71,350
Lower Susq. and Lebanon Valleys	37,405	37,900	37,706	37,775
Pittsburgh district	772,236	770,222	827,285	815,045
Shenango Valley	93,928	131,052	139,835	144,455
Western Pennsylvania	154,451	144,394	150,272	146,886
Maryland, Va. and Ky.	120,428	114,181	115,804	123,447
Wheeling district	130,217	125,009	130,296	127,136
Mahoning Valley	371,718	354,446	368,609	373,181
Central and North'n Ohio	370,967	359,420	377,604	387,383
Southern Ohio	48,835	46,973	54,842	52,232
Illinois and Indiana	706,489	703,228	773,150	772,276
Mich., Minn., Mo., Wis., Colo. and Utah	148,837	131,329	147,992	146,304
Alabama	219,015	182,427	205,209	225,513
Tennessee	9,911	9,670	9,921	9,869
Total	3,588,118	3,497,564	3,755,680	3,785,120

*Revised.

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
October, 1928	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151
September	95,426	21,159	116,585
October	93,644	22,101	115,745

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

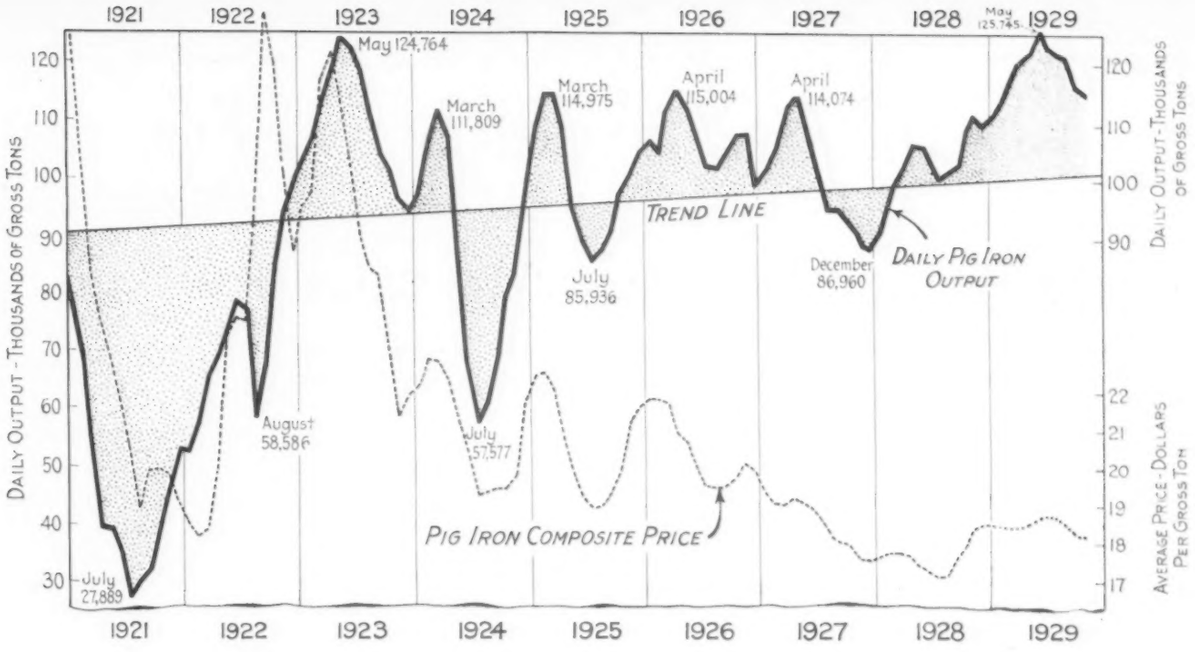
	Nov. 1		Oct. 1†	
Furnaces	Number in Blast	Gross Tons per Day	Number in Blast	Gross Tons per Day
New York:				
Buffalo	14	7,085	14	7,230
Other New York	3	1,065	2	615
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	7	2,730*	7	2,750*
Schuylkill Valley	5	2,430	5	2,310
Susquehanna Valley	2	1,205	2	1,260
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	36	23,600	39	25,050
Ferro. and Spiegel	3	495	3	460
Shenango Valley	5	2,270	8	4,370
Western Pennsylvania	8	4,390	9	4,415
Ferromanganese	2	400	2	395
Maryland	5	2,940	5	2,980
Wheeling District	6	3,520	7	4,165
Ohio:				
Mahoning Valley	18	11,500	20	12,600
Central and Northern	19	12,080	18	11,425
Southern	4	1,570	4	1,565
Illinois and Indiana	33	23,000	32	22,980
Mich., Wis. and Minn.	6	2,915	6	2,820
Colo., Mo. and Utah	4	1,400	4	1,860
Ferromanganese	1	70	0	....
The South:				
Virginia	1	250	0	....
Ferromanganese	1	95	1	90
Kentucky	2	850	2	725
Alabama	16	7,420	13	6,020
Ferromanganese	0	....	0	....
Tennessee	2	320	2	320
Total	203	113,600	205	116,405

*Includes spiegeleisen. †Revised.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,898,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
Aug.	2,947,276	3,136,570	3,755,680
Sept.	2,774,949	3,062,314	3,497,564
Oct.	2,784,112	3,373,806	3,588,118
10 mos.	30,888,175	31,165,435	36,267,442
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



For Eight Months Production of Pig Iron Has Exceeded the Peak of Five Preceding Years

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

due to a marked lowering of the rate toward the end of the month with a number of furnaces shut down on Oct. 31 and Nov. 1. Eight furnaces were blown in and 10 were shut down by Nov. 1—a net loss of two. In September there was a net loss of 5 furnaces.

The Steel Corporation blew out seven furnaces and blew in two while independent steel companies blew in three and shut down two—a net loss of four steel-making stacks. Three merchant furnaces were blown in and one was blown out—a net gain of two. Thus the net loss for the month was two steel-making stacks.

New Record for Ten Months

For the ten months ended with October a new high for any such period was recorded—36,267,442 tons. The nearest approach to this was 34,244,031 tons to Nov. 1, 1923, an increase this year of 2,023,411 tons, an increase of almost 6 per cent.

Steel-Making Iron Declines

Loss in steel-making iron was 1782 tons per day from September with the production 93,644 tons per day against 95,426 tons per day in September. Merchant iron gained in October at 22,101 tons per day compared with 21,159 tons each day in September.

Large Gain in Ferromanganese

At 31,108 tons as the production of ferromanganese in October, the month's total was the second largest this year. The high for the year was 33,363 tons in June. A Western steel company blew in a furnace on ferromanganese last month.

Possibly Active Stacks Reduced

With the dismantling of the Big Stone Gap furnace of the Intermont Coal & Iron Corporation in Virginia, the possibly active stacks in the United States has been reduced from 318 to 317.

Furnaces Blown In and Out

Among the furnaces blown in during October were one furnace of the Witherbee-Sherman Co., Port Henry, N. Y.; the Pulaski furnace in Virginia; one Toledo furnace in northern Ohio; No. 5 Iroquois furnace of the Youngstown Sheet & Tube Co. in the Chicago district; one furnace of the Colorado Fuel & Iron Co., in Colorado; one Pioneer furnace of the Republic Iron & Steel Co. and one Bessemer and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Among the furnaces blown out or banked during October were one Carrie and one Edgar Thomson furnace of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Colonial furnace in western Pennsylvania; one furnace of the Carnegie Steel Co. in the Mahoning Valley; two Newcastle and one Farrell furnace of the Carnegie Steel Co. in the Shenango Valley and No. 2 Weirton furnace of the Weirton Steel Co. in the Wheeling district.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
Aug	2,213,815	2,561,904	3,065,874	21,279	24,583	28,461
Sept.	2,090,200	2,477,695	2,862,799	20,675	22,278	27,505
Oct.	2,076,722	2,729,589	2,902,960	17,710	23,939	31,108
10 mos.	23,420,293	24,909,532	28,911,845	252,997	254,672	278,950
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Buying Becomes More Cautious

Initial Effect of Stock Market Break Is a Decline in New Business—Specifications Hold Up Well—Cold-Finished Bars Cut $2 a Ton

THE initial effect of the stock market break on the iron and steel industry has been to accentuate caution on the part of buyers. New business has been light and the placing of some prospective tonnage has been delayed, indicating that purchasers wish to obtain a better appraisal of the influence of the securities debacle on their own businesses before making further commitments in raw materials.

Cancellations reported, however, are almost negligible and specifications against unfilled orders have held up well, with reductions chiefly of the kind that would have been made regardless of developments in Wall Street.

The low iron and steel inventories of large consuming industries are one of the favorable features of the situation. Many companies that use steel in a big way have no more than a fortnight's supply. Jobbers' stocks, also, are reported to be low.

If there is an inventory problem among manufacturing users of iron and steel, it is due more largely to an accumulation of finished product than to the stocking of materials. Supplies of manufactured goods that have heretofore been regarded as normal might easily become excessive if the buying power of ultimate consumers were seriously curtailed.

Thus far few evidences of reduced popular demand for consumption goods have appeared except in the automobile industry. Motor car manufacture was suffering from the effects of overproduction before the stock market collapse, being one of the few outlets for steel in which excessive activity developed, but the period of readjustment, if present indications are borne out, has been prolonged by the Wall Street crash. Automobile makers generally are revising production schedules downward.

Consumer demand for goods outside of the luxury or semi-luxury class is expected to hold its own unless serious unemployment should develop. Farm implement manufacturers have not altered their production programs, which remain at a high rate. The output of stove manufacturers in the St. Louis district is one-third greater than a year ago. Operations of a leading radiator manufacturer are the highest since February.

Although carefully appraising possible unfavorable effects from stock market liquidation, the iron and steel trade is not closing its eyes to the benefits that will accrue, especially from easier money. Chicago reports that a more active bond market will release a large accumulation of public improvement work, and that the floating of mortgage loans will have a stimulating effect on private building within six or eight weeks. According to more conservative opinion, based on past experience, lower money rates are unlikely to result in any general acceleration of building activity for four or five months.

A quicker reaction is looked for in the demand for railroad equipment, since lower money rates will enable the carriers to market equipment trust certificates more easily. Demand for rolling stock was active even before the stock market break, but more favorable buying terms are expected to speed up action on pending inquiries and to bring out new equipment programs. Freight cars now in the market number 14,000, including 2300 on which the Missouri Pacific has just asked for figures. Inquiries from Eastern lines for 20,000 additional cars are looked for before Jan. 1. The Missouri Pacific, the St. Louis-San Francisco, the Rock Island and the Wabash have asked for tenders on a total of 125 locomotives.

Rail contracts have been swelled by an order from the Missouri Pacific for 61,000 tons, reported anonymously a week ago as only 40,000 tons. The Southern Pacific has entered the market for 122,000 tons.

Iron and steel prices remain relatively steady. Cold-finished bars and shafting have been marked down $2 a ton and black sheets at Chicago have receded by a similar amount, but with these exceptions no general reductions have been made. Scrap markets are weaker. Although no price reductions are reported at Pittsburgh, heavy melting steel has dropped 25c. a ton at Chicago, with declines in other grades ranging up to $2.50 a ton. At St. Louis consumer buying of scrap has practically ceased and cancellations and suspensions are reported.

Steel ingot output has receded to 60 per cent in the Valley district and to 75 per cent at Pittsburgh and Cleveland, but remains at 80 per cent at Chicago. The average for Steel Corporation subsidiaries and for the Bethlehem plants is estimated at 82 per cent. October output of steel was held up, in part, by the stocking of ingots and semi-finished steel, but this cannot be continued.

Pig iron production in October totaled 3,588,118 tons, the largest output for that month on record. At 115,745 tons, the daily rate showed a decline of only 0.72 per cent from that of September. There was a net loss of two active stacks in the month, eight having been blown in and ten having been put out. The operating rate Nov. 1 was 113,600 tons, compared with 116,405 tons on Oct. 1.

THE IRON AGE composite prices are unchanged, finished steel at 2.362c. a lb. and pig iron at $18.38 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Nov. 4, 1929	Oct. 29, 1929	Oct. 8, 1929	Nov. 5, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	19.76
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.95
Bars, Chicago	2.00	2.00	2.05	2.00
Bars, Cleveland	1.90	1.90	1.95	1.90
Bars, New York	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	*2.17½*	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.05	2.00
Structural shapes, New York	2.14½	2.14½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Nov. 4, 1929	Oct. 29, 1929	Oct. 8, 1929	Nov. 5, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.40	2.40	2.45
Barbed wire, galv., P'gh	3.05	3.05	3.10	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$17.25	$17.50
Heavy melting steel, Phila	15.50	15.50	16.00	15.50
Heavy melting steel, Ch'go	*13.75*	14.00	14.50	14.50
Carwheels, Chicago	14.00	14.00	14.00	14.25
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.75
No. 1 cast, Ch'go (net ton)	*14.00*	14.50	14.50	15.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	*13.00*	14.00	14.00	13.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.90
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	*40.12½*	40.75	43.37½	49.25
Zinc, East St. Louis	*6.50*	6.60	6.80	6.25
Zinc, New York	*6.85*	6.95	7.15	6.60
Lead, St. Louis	*6.35*	6.55	6.70	6.32½
Lead, New York	*6.50*	6.75	6.90	6.50
Antimony (Asiatic), N. Y.	*8.62½*	8.75	8.50	10.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Curtailment of Orders for Steel Follows Stock Market Break—Production is Moderately Lower

PITTSBURGH, Nov. 4.—While steel companies in this and nearby districts felt an immediate adverse effect from the recent sharp decline in stock prices, no signs of an extended period of depression are yet in evidence. New buying last week was exceedingly light, but tonnage releases came in at about the same rate as they did during October. In some cases, specifications were reduced somewhat, but such curtailment was generally to be expected and would have undoubtedly occurred in spite of the trend of the financial markets. On the other hand, buyers of steel who had contemplated increasing their steel needs or had planned to place orders in the near future, have now postponed their action.

Curtailment in steel works operations continues in this and nearby districts, but there is no evidence that it is being hastened by uncertainty in financial markets.

The Steel Corporation subsidiary took off four blast furnaces at its Valley plants during October, but reduced its active stacks in the Pittsburgh district by only one furnace. This is in line with the trend of open-hearth operations in the two districts, as the rate in the Valleys is not far above 60 per cent this week, while Pittsburgh plants are still above 75 on the average. The latter figure is possible, however, largely because of the comparatively high rate of the leading interest, which is benefiting by recent rail tonnage and heavy backlogs of structural shapes and plates.

While the principal independent steel producer in the Pittsburgh area is not so well supplied with advance work, its operating rate is above the average and compares favorably with the operations of the smaller independent companies, some of which are at at low as 50 per cent of capacity.

Finishing mills, especially in the Youngstown area, are running somewhat better than the open-hearth departments, as many companies accumulated stocks of crude steel during October and are now anxious to reduce their inventories as rapidly as possible.

The very low inventories of the large steel-consuming industries offer the most certain indication of the healthy state of the steel industry. Scarcely any company which uses steel in a large way could operate for two weeks if its steel supply were to be cut off. Stocks of steel jobbers are also low and nothing short of a complete paralysis of the country's business would force makers of steel into really serious difficulties. For this reason, the attitude of Pittsburgh companies is still hopeful and the extreme pessimism which accompanied the sharp break in stock prices last week has been changed to a feeling of confidence in the basic soundness of the business situation.

Steel company executives have not lost sight of the fact that the remainder of the year may be rather quiet from a business standpoint, with the automobile industry taking less than half its usual tonnage of steel, but other consumers, notably the railroads, are helping to fill in the breach. In

fact, it is expected that large Eastern roads may add about 20,000 freight cars to the pending list before the first of the year.

The price situation is still generally satisfactory, although the reduction of $2 a ton in the price of cold-finished steel bars and shafting last week was considered ill-timed by some makers. Bars, shapes and plates are holding at 1.90c., Pittsburgh, although this figure has not been widely tested on large tonnages. This is true with a number of present quotations, but sellers have no difficulty in maintaining prices on small tonnages which are being closed from day to day. It is generally admitted by both buyers and sellers that lower prices would not stimulate buying to any extent at the present time.

The pig iron market is hardly as strong as it has been. Although definite reports of shading the Valley furnace prices are lacking, recent sales of basic iron by Pittsburgh district furnaces have been subject to question from the price standpoint.

Scrap is not quotably lower, but the trend of the market is toward weakness. A recent sale of railroad heavy melting steel brought close to $17.50 at a nearby steel plant, but the Pennsylvania Railroad steel, which closes this week, may not bring such a high figure.

Pig Iron.—The pig iron market lacks strength, and prices are holding largely because of a lack of heavy tonnage buying. Most sellers freely admit that a large tonnage of basic or foundry iron would bring out quotations under $18.50, Valley, but recent buying has offered no such situation. Purchases are still confined to small lots, which command the full market quotations on basic and foundry as well as on malleable and Bessemer. The Edgewater Steel Co. is reported to have bought a tonnage of basic iron, but information is lacking as to the amount involved and the price paid. The Elliott Co., Jeannette, Pa., has closed with several makers for about 600 tons of foundry iron and 150 tons of Bessemer. This business is reported to have brought the full market price. Iron shipments from both Valley and Pittsburgh furnaces are now somewhat lighter than production, and makers are watching the trend of business very closely in an effort to decide whether or not to blow out furnaces. Unless conditions improve in the next two weeks, it is likely that at least one less merchant stack will be operating. The Weirton Steel Co., which was a buyer of basic iron during the summer months, has blown out one of its furnaces for relining.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Occasional spot sales of billets, slabs and sheet bars are reported in this district, and one seller, most of whose business is done under long-time contracts, is having no difficulty getting $35, Pittsburgh or Youngstown, with full extras for this material. Concessions might be obtained if a fair inquiry came out, but, as a great percentage of semi-finished steel to be used this quarter is already contracted for, the spot market can still be quoted at the above figure. Considerable tonnage is undoubtedly moving at lower prices, but as large buyers seldom, if ever, pay the full quoted price for their material, there seems to be no reason to recognize this tonnage as establishing the market now. Shipments of semi-finished steel during October declined somewhat from those of the previous month, but the decline has been very gradual. The early days of November have brought no decrease in shipments, although some companies which had contemplated increasing their takings are now inclined to wait for a time. This is particularly true in the case of makers of strips and sheets, who have failed to see any marked improvement in their business in the last few days and who wish to maintain supplies of crude steel at a minimum. The price of forging billets is open to question on occasional transactions, but no sales at less than $40, Pittsburgh, are reported. The $40 price on wire rods seems to be well established, although business is exceedingly quiet.

Rails and Track Accessories.—Business has been rather quiet in the last week. This district did not participate in the recent order for 61,000 tons of rails placed by the Missouri Pacific. Specifications for accessories are beginning to improve somewhat, particularly from roads which placed rails early in the season. Demand for light rails is improving seasonally, as the coal industry is rather active at this time. Rail mill operations are continuing to improve, but have not yet reached capacity rate.

Bars, Shapes and Plates.—Business has been exceedingly quiet during the week, but the larger companies have received no orders for hold-ups or cancellations of shipments. Demand for plates is comparatively strong, although quick deliveries are possible from most of the leading mills. Specifications from the car builders are coming in regularly, but shipments to barge yards in this district are declining as most of the barges ordered in the spring and summer have now been completed. However, the prospects in this field are exceedingly good, and, with one large inquiry for barges still pending and several others in process of negotiation, there is every reason to believe that this industry will be a large user of steel over the next few months. Fabricating shops are busy, and shape mills have curtailed operations very little as compared with other departments. Bars are quiet, as many of the large consuming industries are operating at a low rate. The price on bars, shapes and plates has settled to 1.90c., Pittsburgh, and this now represents the maximum on all but occasional small orders. This price seems to be reasonably firm, although large buyers undoubtedly obtain the usual differentials.

Wire Products.—The wire mill situation is essentially unchanged, but if there is any noticeable tendency it is toward further price stabiliza-

The Iron Age Composite Prices

Finished Steel

Nov. 4, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 4, 1929, $18.38 a Gross Ton

One week ago	$18.38
One month ago	18.29
One year ago	18.34
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c. to 2.05c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.90c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
¼	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

¼	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47¼	1 to 2	34	18
1 to 1½	60	49¼			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

tion. In the immediate Pittsburgh district wire nails are holding at $2.50 to the trade, and jobbers are unable to get more than their regular $2 concession. The same is true as to plain wire to jobbers, and the price on wire to the manufacturing trade is unchanged at 2.40c. a lb., Pittsburgh. Demand is quiet. Shipments by some makers last month declined very sharply.

Bolts, Nuts and Rivets.—Business in bolts and nuts has experienced some decline in the last few weeks, but this was to be expected in view of the gradual tapering off of steel business in general. Jobbers' stocks of bolts, nuts and rivets are ample and they are now inclined to wait for further reduction in inventories before reordering. The car builders are still very good customers, as are fabricating shops and barge yards, and railroad demand is good. The average operating rate of the industry has declined to about 65 per cent of capacity, and the figure is lower in some plants. Prices are well established at 70 per cent off list for bolts and nuts, and $3.10 a 100 lb., Pittsburgh or Cleveland, for large rivets. Small rivets are quoted at 70 and 10 per cent off list.

Warehouse Business.—October was a fairly good month for local warehouses, although price weakness developed in some lines, and tonnage tapered off slightly in others. Generally speaking, business was about equal to the total of the same month last year. Both wire and wire nails are quotably lower, although a tendency toward strength in these products has developed in the last two weeks. Sheet steel is also weak, but local jobbers are maintaining their quotations in the face of occasional shading. Bars, plates and shapes are still holding fairly well.

Tubular Products.—Pipe mill operations are gradually declining, although the present rate is still somewhat higher than the year's average, and had declined only about five points from the maximum reached a few weeks ago. The average for the entire industry is estimated at somewhere between 60 to 65 per cent of capacity, with seamless mills at a slightly higher rate and butt-weld units somewhat lower. Demand for the latter product is expected to decline seasonally, and demand for seamless material is also experiencing a slight decline in the oil country. Large orders for lap-weld tubing have practically all been executed and mills are now operating on a hand-to-mouth basis, with business made up largely of feeder lines and other small tonnage business. There are good orders for boiler tubes and locomotive tubing, but declining operations in the automobile industry have brought about a marked decrease in the movement of mechanical tubing. Prices are reasonably firm.

Prices on black and galvanized steel butt-weld pipe and also on iron pipe have been advanced slightly by the elimination of the extra 2½ per cent discount, which had recently been extended to include the smaller jobbers. The 2½ per cent discount is now given only to the larger buyers.

Tin Plate.—Tin plate operations have not declined further in the last week, and the average for the industry continues at about 60 per cent of capacity. The leading interest is operating at a slightly higher rate, as it has been able to begin work on anticipated tonnage for 1930 before the independent companies. The price for next year has not yet been announced, and opinion varies as to what it may be. It does seem rather certain that there will be no advance.

Strip Steel.—Any improvement expected in the automotive trade this week was evidently postponed by the financial situation, and demand has generally been light. Operations continue at about 50 per cent of capacity and this rate is just about sufficient to meet current requirements. Consumers are generally thought to be without stock accumulations and no sharp decline in shipments is expected over the next few weeks. In fact, any improvement in demand from the automobile industry would be reflected immediately in shipments and rollings. Prices lack strength, but shading is confined to occasional sales where outside considerations have had a prominent influence. Cold-rolled material is now quotable at 2.75c., Pittsburgh, and hot-rolled at 1.90c. and 2c., Pittsburgh, depending upon the width.

Cold-Finished Steel Bars.—A rather sudden reduction of $2 a ton in the price of cold-finished bars has been met by producers in this district, although weakness was apparent heretofore principally in the Chicago district. The decrease was apparently prompted by recent reduction in the price of hot-rolled bars. The lower price has not stimulated business, which remains very quiet. However, the industry is in a favorable position. Most cold-finishing mills have little more than a two-weeks' supply of hot-rolled bars on hand and are constantly reducing this tonnage. The price is now 2.20c., Pittsburgh.

Prices on turned and ground shafting have also been reduced $2 a ton, and are now quoted at 2.55c. to 3.50c., base Pittsburgh, according to size.

Sheets.—The new month has failed to bring any improvement in the buying of sheets, and operations continue to taper. The average for the industry is probably not more than 60 per cent of capacity, with specialty mills at a lower rate, and the leading interest at about 70 per cent. Specifications last week were extremely light, although the stocks of some consumers are so low that they are forced to place rolling orders every few days if they are to keep their plants running. Demand from the automobile industry is still disappointing, and the largest maker of cars in the low-priced field has met with some delay in re-tooling its plants for slight model changes. Although this company's schedule formerly called for slightly less than 200,000 cars in the remaining two months of the year, this figure may have to be reduced. Other automobile makers, which had stepped up their production on new models, have curtailed again. The automobile industry is watching the trend of the security markets more carefully than any other large steel consumer. Other buyers of sheets are taking material at a fair rate, and many metal furniture makers are operating at close to capacity. Under such conditions, demand for metal furniture sheets is very strong, while the reverse is true with automobile body sheets. Auto sheet makers are also meeting with considerable price pressure, although the 4c. Pittsburgh price has not yet been broken. Black sheets are also holding at 2.75c., Pittsburgh, and concessions of $1 a ton are all that have been developed by large Michigan buyers. Galvanized sheets are still quotable at 3.50c., Pittsburgh, although the $2 preferential to jobbers is being given by a number of mills. Blue annealed sheets and light plates are holding fairly well.

Coal and Coke.—This market has seen little change, but the price tendency in furnace coke is toward weakness rather than strength. The steel companies are doing no buying and have reduced shipments rather sharply in recent weeks. Warm weather has had an adverse effect on the movement of domestic coke, and the foundry grade is only fairly active. Prices are unchanged on coke, while

(*Concluded on page* 1271)

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	75, 20, 10 and 5
Stove bolts in packages, Chicago.	75, 20, 10 and 5
Stove bolts in packages, Cleveland.	75, 20, 10 and 5
Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Demand Has Tapered in Some Directions But Mill Output Remains at About 80 Per Cent

CHICAGO, Nov. 4.—Steel demand in some directions has tapered, but the increased movement of car materials and the prospect that this tonnage will gain larger proportions lend support to the belief in the local trade that production of steel in nearby weeks will be supported at about 80 per cent of ingot capacity, the current rate.

Farm implement manufacturers are holding to production schedules made early in the fall. It is not improbable that mortgage loans for building construction will, in the course of six to eight weeks, again support a more general and a larger demand for structural materials, and a more active bond market will afford the means of releasing a large amount of public improvement work which has been accumulating in and near Chicago.

Tendencies as to prices still lean to the weak side. Mild steel bars at 2c. to 2.05c. a lb., Chicago, are lacking in strength, and quotations on galvanized and black sheets have given ground in the last week. Cold-finished bars have been marked down $2 a ton, effective Nov. 1, for distribution from all basing points.

The local scrap market is wholly in the hands of buyers, who in many cases have accumulated sizable stocks and who will no longer listen to overtures by sellers. The stress of this situation appears not to have reached a culmination for the reason that supplies at points of production and in yards, both country and city, are accumulating at a rapid rate.

Current specifications for finished steel are well up to the average of recent weeks. Sales, though in good aggregate tonnage, are largely influenced by new business in rails and therefore do not give a clear picture of the market as a whole.

Pig Iron.—The Northern foundry iron market remains steady, with shipments practically equal to the full output of local furnaces. Shipments, which started to climb late in October, are still on the upswing. This situation leaves local producers with no opportunity to stock iron. Prices remain firm at $20 a ton, local furnaces. Scattered and small sales of charcoal iron are reported at $24 a ton, furnace. Among boat shipments which have arrived at Chicago docks in the last week are a cargo of silvery and one of low phosphorus iron. The Southern iron market remains at $13 to $13.50 a ton, Birmingham; the freight rate to Chicago is $6.01 a ton.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Cast Iron Pipe.—New orders for cast iron pipe are confined to a few scattered tonnages in nearby towns. Municipalities find little need for this commodity at this time of the year, and private buying is of small proportions. Public utilities have completed their programs for this year, and it will be December or January before they make known their wants for 1930. October sales were a shade under the volume in September and smaller than in the tenth month a year ago. Prices remain steady and deliveries on most sizes are prompt.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Ferroalloys.—It is reported here that buyers of 50 per cent ferrosilicon will be offered 1930 contracts in the course of the next three weeks. No announcement has been made concerning next year's prices. New demand for other ferroalloys is dull.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Structural Material.—Preliminary estimates of the need for steel for buildings to be constructed for the Chicago World's Fair are in excess of 50,000 tons. While there will be many structures of temporary type, it is planned to construct some buildings with the thought in mind that they can be put to practical use after the close of the fair. In addition to the steel needed for buildings, there will also be a large tonnage used in bulkheads and steel piling. Fresh inquiry and lettings of structural projects are light. Fabricators west of the Mississippi River have fair backlogs of highway bridge work, and similar new projects are taking shape. Indiana shops are in need of work, while local operations are spotty, with several shops in need of additional tonnage.

Mill prices on plain material, per lb.: 2.00c. to 2.05c. base, Chicago.

Plates.—Fully 30,000 tons of steel will be needed for new cars to be purchased by the Missouri Pacific. Steel needs for other car construction total more than 170,000 tons, including the tonnage for the recent Santa Fe orders. It is reported here that several sizable orders for tank plates have been placed with mills to the east of Chicago. Deliveries on plates are improved, as additional suspension orders reach the manufacturer of electrically welded pipe.

Bars.—Chicago bar mills continue to operate at 80 per cent of capacity and specifications fully match current shipments. Deliveries on mild steel bars are prompt on most sizes, and prices are steady at 2c. to 2.05c. a lb. Farm implement manufacturers are taking uniform quantities of steel, while, on the other hand, forgers' needs are spotty and small. Some improvement is noted in specifications for alloy steel bars. Consumption, however, is spotty and the small upturn in releases is not taken by the trade as an indication that demand is on the mend.

Cold-Finished Steel Bars.—Prices for this commodity have been marked down $2 a ton, effective Nov. 1. Specifications from sources other than automobile manufacturers are ample to support output at 75 per cent of capacity at local plants.

Bolts, Nuts and Rivets.—Demand from railroads, car shops and manufacturers of farm machinery shows further growth. Prices are holding.

Wire Products.—Specifications entered at mills by the manufacturing trade show some improvement, but the character of this business is spotty and is not taken by sellers as foretelling a continued increase in demand from this direction. Forward contracting also has gained ground, but it is pointed out that this business is not represented by fresh inquiries, but is largely resulting from the placing of business which has been before the trade for many weeks. Jobbers continue to take wire products at a steady rate. Some easing in demand is noted from the Northwest, where conditions were not generally so good from the point of view of crops as in other parts of the country. Orders for woven wire fencing are unusually large. This is accounted for in part by open fall weather, which is favorable for the repair and extension of fences. Most of the fencing shipments are from mill stocks, which were expanded through the summer and early fall. Reports from the trade, as well as the character of current orders, tend to confirm the view that

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (7/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 5/8 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to $2.95
Cement c't'd nails, base per keg	2.75 to 2.95

stocks in the hands of buyers are small. Jobbers are ordering at frequent intervals and in mixed lots, while manufacturers are taking wire at extremely close range in their efforts to hold stocks on hand to a minimum as the inventory season approaches. Stocks at mills are said to be normal for this time of the year. Prices are stable in a market which does not afford a real test of the situation.

Warehouse Business.—Recent sales of common and cement coated nails from warehouses establish prices in the range of $2.75 to $2.95, base, a keg. Quotations on other commodities are steady, and demand shows little change from the rate in the previous month. Judged by past performances, November is not expected by warehouses to measure up in volume of shipments to October, which often is the best month in the year. Several months in 1929 showed a surprisingly large movement of steel from warehouses, and it therefore has been no surprise that October this year has not stood out as has the same month in previous years.

Rails and Track Supplies.—The purchase of standard-section rails by the Missouri Pacific, which last week was named as a large Western railroad, is about 61,000 tons, rather than 40,000 tons, as previously reported. Fresh inquiry for 122,000 tons has come from the Southern Pacific. It is not clear in the minds of local sellers whether this tonnage covers the entire needs of this railroad and its subsidiaries or whether the needs of the latter will be sought at a later date. The Southern Pacific usually places separate tonnages for its affiliated companies. Local mills estimate that about 55 per cent of the fall buying of rails in Western territory has been completed. Releases against new contracts are only in such volume as to support rail mill output at 80 per cent of capacity. In fact, there are some indications that the railroads have revised their plans for releases this fall, and possibly shipments from now to the end of the year will not gain much. The track accessory market is quiet, but inquiries are taking shape for tonnages needed to go with recent rail purchases. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—The price structure of the Chicago scrap market is breaking down under pressure of over supplies of many grades and the insistent efforts of sellers to place tonnages in a market which is wholly in the hands of consumers. Heavy melting steel is being purchased freely by brokers at $13.75 a gross ton, delivered, and consumers have refused offers of this grade at $14. One local steel mill is said to have a heavy stock, while another large buyer gives the same impression to dealers as he steadfastly refuses to accept shipments. Incoming tonnages are giving much trouble to dealers, and accumulations are growing in local scrap yards. The cast iron boring market is unusually dull. Sellers who name new low prices are surprised to find that consumers are completely without interest in the market and decline to make counter offers. Notable among price changes this week is a drop of $1.25 a ton for frogs, switches and miscellaneous rails and $2.50 a ton for iron arch bars and transoms.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.75 to $14.25
Shoveling steel	13.75 to 14.25
Frogs, switches and guards, cut apart, and misc. rails	14.50 to 15.00
Hydraul. compressed sheets	12.00 to 12.50
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.00 to 12.50
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.00 to 18.50
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.50 to 17.00
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	13.50 to 14.00
Low phos. punchings	16.00 to 16.50
Low phos. plates, 12 in. and under	16.00 to 16.50
Blast Furnace Grades:	
Axle turnings	11.50 to 12.00
Cast iron borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	15.50 to 16.00
Rerolling rails	16.00 to 16.50
Cupola Grades:	
Steel rails less than 3 ft.	16.50 to 17.50
Steel rails less than 2 ft.	19.50 to 20.00
Angle bars, steel	16.25 to 16.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.50 to 17.00
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	18.00 to 18.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.25 to 12.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.25 to 12.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Prices for black and galvanized sheets are giving ground in this district. Black sheets are now quotable in the range of 2.85c. to 2.95c. a lb., Gary, and the galvanized product is bringing 3.60c. a lb., Gary, on the bulk of current business. Shipments of most grades from Western mills are little changed from a week ago, but recent releases are lighter and forecast a revision downward in the rate of operations from the 85 per cent of capacity mark. Many manufacturers are close to the period of inventory taking, and the character of their orders indicates not only that stocks on hand are small, but that they are paring down incoming supplies as closely as possible. Sellers, believing that stocks are close to the minimum, feel that the loss in specifications is a direct reflection of the general business situation. Local mills are beginning to accumulate stocks, which have been negligible for several months.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.85c. to 2.95c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Buyers' interest in this market is confined almost wholly to a moderate tonnage composed of miscellaneous small orders. Most promising among fresh inquiries is the 500 tons needed for the Henrotan Hospital, Chicago. Among the more active projects is the steel for the buildings which will be erected by Illinois at various institutions scattered throughout the State. Prices show no improvement, as they rest at the lowest level so far this year. The rail steel commodity seems well established at 2c. a lb., but billet steel reinforcing bars are weak, when quotations are made on attractive tonnages. Bending shops remain active at a normal fall rate.

Commissioner Charles H. March of the Federal Trade Commission will preside at the solid-section steel-window trade practice conference, which has been scheduled for Nov. 18 at the Chamber of Commerce of the United States.

Large Tonnages of Steel in Chicago Building

THE Merchandise Mart of Chicago, now in course of construction, which will be the world's largest building, will require 60,000 tons of structural steel, including 61,000 columns, girders and beams; 142 miles of pipe for the sprinkler system; 32½ miles of pipe for the steam heating system; 40 miles of plumbing pipe; 9,504,000 sq. ft. of steel wire reinforcement for floors, enough for a 100-mile highway 18 ft. wide; 60 tons of wire for 30,000 lighting fixtures, besides many other materials in similarly large quantities, such as 29,000,000 bricks and 132,000 sq. ft. of glass. Contracts for material were let some time ago.

New York

Pig Iron and Steel Buyers Cautious, and Sales are Light—Structural Steel Activity Outstanding

NEW YORK, Nov. 4.—Aside from accentuating the hesitancy of buyers, who had been cautious for some time, the stock market collapse has had little effect on the pig iron market. No suspensions of shipments are reported; on the contrary, pressure for deliveries has increased in some cases where melters allowed their stocks to drop even lower than recent low levels. Pig iron consumption is well sustained, though sales for the week, at 7000 tons, were below normal. In fact, excluding 3000 tons bought by the Thatcher Co., Newark, N. J., they were exceedingly light. The A. P. Smith Mfg. Co., East Orange, N. J., has closed against its inquiry for 300 tons. Very little fresh tonnage has come before the trade. In general, the price situation is unchanged, with $17.50, Buffalo, and $18.50, eastern Pennsylvania furnace, available on No. 2 plain. At points close to seaboard, competition with Southern iron has become more of a factor, with the result that Northern producers have been forced to shade their quotations at times. A tonnage of Northern barge iron stocked at a New Jersey port was recently sold at $19, yard, to meet the Southern price of $19 to $19.50, on docks, New York harbor. Stocks of iron on Northern furnace banks are not excessive; in fact, at Buffalo they are reported to be below normal. Offerings of surplus steel company iron have not increased materially, notwithstanding the recent recession in steel production.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will furnish 1300 tons of bars for the new building of the United States Rubber Co. in Passaic, N. J., for which the Turner Construction Co. has the general contract. Five hundred tons for the Rockaway Beach boardwalk will be supplied by Carroll & McCreary. An award of 1000 tons for the new assembly plant of the Ford Motor Co. at Edgewater, N. J., is expected in the immediate future. Prices are fairly steady at 2.05c., New York.

Finished Steel.—There has been a noticeable hesitancy on the part of buyers in the past week, who are apprehensive in regard to the industrial outlook because of the unsettled condition of the stock market and the disturbing effect of the recent break in stock prices. Specifications and orders have been only fair and have receded somewhat from the level of the previous week. The rather confused situation has contributed to the weakening of prices in some items. Cold-finished bars are down $2 a ton to 2.20c., Pittsburgh, and plates are being sold at 2.17½c. to 2.22½c., New York. The black sheet price remains fairly steady at 2.75c., Pittsburgh. In galvanized sheets, some business is being booked at 3.40c. and 3.45c., but considerable sales are reported at 3.50c., Pittsburgh. Blue annealed stock is firm at 2.10c., Pittsburgh, for No. 10 gage. In an otherwise colorless market, structural steel activities continue a feature. The leading Eastern producer declares that structural business in October "was substantially greater than the bookings of recent months." The October tonnage of fabricated awards in metropolitan New York, compiled by the Structural Steel Board of Trade, is expected to be close to that of August, which was one of the best months of the year.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Warehouse Business.—The past week has brought a slight improvement in the volume of buying from stock, especially in sheets. Prices, however, are still subject to concessions of $1 to $2 a ton on black and galvanized and as much as $5 a ton and more on blue annealed. Demand for structural material from stock continues fair, but tonnages are not so large as a few weeks ago.

Cast Iron Pipe.—Although this is usually a quiet season, sellers of pressure pipe report that buying is even smaller than normal for the fall. With election approaching, municipalities are not inclined to cover requirements until results are known, and private buyers have been less active than usual. It is suggested in some quarters that lower money rates and a better market for municipal bonds may result in the undertaking of needed improvements, including extensions of gas and water service. Both Northern and Southern producers of pipe have but little tonnage booked ahead, and prices are still rather irregular. The city of New York is asking for contractors' bids for furnishing and laying several hundred tons of pipe. About 200 tons of water pipe has been booked by a large Northern maker for export to the Dutch West Indies.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—New Jersey and New England by-product coke producers have opened their books for the first half of 1930 and have renewed a large number of foundry coke contracts subject to prices ruling at time of delivery. New England requirements for

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

the first half are estimated at 150,000 tons. The stock market break has not affected coke specifications; in fact, shipments are showing their usual seasonal expansion. Standard furnace coke is unchanged at $2.75 a net ton, Connellsville, while beehive foundry grade ranges from $3.75 to $4.75, Connellsville. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—The larger consumers of scrap are still receiving sufficient tonnage on old contracts to satisfy their immediate needs and have not yet shown an inclination to cover their future requirements. Meanwhile, a substantial volume of material is available and brokers have reduced their buying price on No. 1 heavy melting steel to $15 a ton, delivered eastern Pennsylvania. Steel car axles are also off slightly and brokers have been able to buy recently at $21.25 a ton, delivered, on a $3.78 per ton freight rate to eastern Pennsylvania. Prices of other grades are unchanged, but lacking in strength.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.50 to	$12.35
Heavy melting steel (yard)	8.00 to	9.50
No. 1 hvy. breakable cast	10.25 to	11.00
Stove plate (steel works)		8.00
Locomotive grate bars		8.25
Machine shop turnings	7.50 to	7.75
Short shoveling turnings	7.50 to	7.75
Cast borings (blast fur. or steel works)	7.00 to	7.75
Mixed borings and turnings	6.75 to	7.75
Steel car axles	17.50 to	18.00
Iron car axles	22.50 to	23.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.25
Forge fire	9.50 to	10.00
No. 1 railroad wrought	12.00 to	12.50
No. 1 yard wrought, long	11.00 to	11.50
Rails for rolling	12.75 to	13.25
Stove plate (foundry)	8.25 to	8.50
Malleable cast (railroad)	13.50 to	14.00
Cast borings (chemical)	9.50 to	10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.50

Cleveland

Steel Consumers Ordering More Sparingly and Some Prospective Business Has Been Held Up—Output Curtailed

CLEVELAND, Nov. 4.—The steel market has been affected by the break in the stock market to the extent that consumers are ordering more sparingly than heretofore and the placing of some prospective business has been held up. As buying had already been greatly curtailed, the immediate effect of the decline in stocks probably was much less than it would have been had the steel market been more active. A feeling of hesitancy and caution has developed, which likely will have an influence on buying for some time.

A favorable factor of the situation is that steel prices have not suffered to any appreciable extent from conditions that developed during the week. There has been some further curtailment in this territory in open-hearth operations, which are down to about 75 per cent. Sheet and strip mill operations are spotty, the average by independent mills being 60 to 65 per cent.

There has been some further curtailment in the automotive industry, which is expected to move at a rather slow pace during the remainder of the year. However, the Ford Motor Co. continues to purchase steel in fair volume and the Chevrolet Motor Co. this week began to take shipments of body sheets for its new models, enabling some of the mills to increase operations.

Pig Iron.—Buying is limited to small lots for early shipment. Sales by Cleveland interests during the week aggregated 9500 tons, or about the same as during the previous week. Consumers are taking no interest in first quarter contracts and producers are making no effort to make sales for that delivery. November has started with a light volume of shipping orders. Producers do not look for much improvement in the demand from the automotive industry before December. Stove and radiator foundries are taking a fair amount of iron. Jobbing foundries are not doing so well as recently. Ohio foundries maintained 102 per cent of normal operations during September, as compared with 109 per cent in August and 90 per cent in September, last year, according to the monthly report of the Ohio Foundries Association, based on returns from 39 foundries. Prices are steady and unchanged at $18.50, Cleveland, for foundry and malleable iron for outside shipment and at $19, furnace, for local delivery and $19.50 to $20 for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., sil. 1.75 to 2.25	$20.50 to	21.00
Malleable		19.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace		18.50
Stand. low phos., Valley	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Water shipments of Lake Superior ore up to Nov. 1 amounted to 61,253,954 gross tons, an increase of 11,534,023 tons over the total for the same period last year. Shipments during October were 7,989,127 tons, a decrease of 464,825 tons as compared with October last year. Bad weather interfered somewhat with the October movement. Shipments to Nov. 1 broke all previous records of water shipments for the season except in 1916 and 1917. The peak was reached in the former year with a water movement of 64,734,198 tons. Whether this record will be broken this year depends to a considerable extent on weather conditions this month. The November movement, according to present estimates, will be about 3,500,000 tons, and if that tonnage is moved, water shipments for the year will slightly exceed the former high record.

Semi-Finished Steel.—With curtailment of the demand, some producers would like to take on additional business, but inquiry is lacking. Specifications for sheet bars are fair, but slabs are moving slowly because of the light operations by the hot-rolled strip mills. The leading local producer is still operating 11 of its 14 open-hearth furnaces, with enough orders on its books to keep operating seven days. Prices are steady at $35, Cleveland and Youngstown, for sheet bars, billets and slabs.

Bars, Plates and Shapes.—Structural shapes continue in fair demand, being more active than steel bars and plates. However, plate inquiries have improved, being largely for tank work in lots up to 400 tons. The Cleveland water pipe inquiry requiring 3000 tons is still pending. Steel bar tonnage is fair except from the automotive industry. In the building field a 3300-ton award for an Akron department store has been made. Steel bars are unchanged at 1.90c., Cleveland. Shapes and plates range from 1.90c. to 1.95c., Pittsburgh, the lower price being named by some mills to large tonnage buyers.

Sheets.—New orders are scarce for all grades. Most consumers have fair stocks and are reducing their inventories. The aggregate tonnage coming from the automotive industry is light. Local plants making miscellaneous stampings are operating at about 55 per cent, while those making automobile stampings are running at not above 30 per cent of capacity. Business is slow with manufacturers of metal partitions and other building material. Weakness in blue annealed sheets has become more pronounced and quotations of 2.25c. for No. 13 and 2.10c. for No. 10 are more common. Some of the continuous mills are naming a 10c. per 100 lb. differential below the

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.65
No. 9 gal. wire, per 100 lb	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

regular quotations, and some of the jobbing mills are meeting this concession. Weakness has developed in galvanized sheets, which range from 3.40c. to 3.50c., Pittsburgh. Black sheets are firm at 2.75c.

Strip Steel.—Very little new business is coming out in either hot or cold-rolled strip. The automotive industry is ordering only in small lots for early needs. Regular quotations on hot-rolled material are being well maintained, although these have not been tested recently on round lots. Concessions to 2.65c., Cleveland, are reported on cold-rolled strip, but these are not common.

Wire Products.—The nail market has a firmer tone than recently. While sales are light, the $2.40 per keg price is being adhered to. Demand for wire continues dull, and the regular price is well maintained.

Cold-Finished Steel Bars.—A price reduction of $2 a ton to 2.20c., Cleveland and other basing points, is announced, effective Nov. 10. Fourth quarter contracts will be revised to the new price. Specifications continue light.

Old Material.—Activity is at a minimum because mills are taking very little scrap. Dealers are having difficulty in disposing of material they are anxious to move, and prices on some grades are weaker. One local mill is now taking no scrap of any grade, having cut off on blast furnace material during the week. Valley district mills have cut down on scrap shipments materially. Machine shop turnings have declined 25c. a ton. Short shoveling turnings are holding to recent quotations, one fair-sized lot having been sold during the week at $12. A small lot of low phosphorus forging crops brought $18. Cast scrap declined 50c. a ton. Heavy melting steel has been offered in the Valley district at $16.75.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.25
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Concessions of $1 On Plates—High-Finished Sheet Prices Lack Strength—Jobbers Reduce Sheets

PHILADELPHIA, Nov. 4.—Plate prices show a tendency to sag $1 a ton, but eastern Pennsylvania producers are still quoting 2.05c., Coatesville, with concessions for desirable business. Shape mills continue well engaged, but prices lack strength. Among the smaller buyers of iron and steel, a considerable degree of caution has developed as a result of the unsettled condition of the stock market, and there is a strong inclination to delay purchasing to determine what reaction, if any, has developed in their particular lines. Consumers of high-finished sheets report having received concessions in the usual extras charged for these grades. Jobbers in this district have reduced warehouse prices for black and galvanized sheets $4 a ton and cold-finished steel prices $2 a ton.

Pig Iron.—Shipments on contracts are going forward with few requests by consumers for delay, but buyers show no inclination to cover forward requirements. One local consumer of foundry iron, in the market for 1000 tons of foundry iron for more than two months, has been covering immediate needs by purchasing carload lots and expects to continue this policy for the remainder of the year. Eastern Pennsylvania furnaces quote $21, base furnace, for foundry iron, occasionally shading this price 50c. a ton on desirable orders.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to small lots and specifications against current contracts, which have been revised to 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—Projects involving substantial bar tonnages are pending award, including about 200 tons for the Farm Show Building, Harrisburg, Pa., and 400 tons for the Convention Hall, Philadelphia. A proposed hydroelectric development, including a $4,300,000 dam at Safe Harbor, Pa., will require a sizable tonnage of reinforcing bars. The general contractor is the Arundel Corporation, Baltimore. Prices are unchanged, with billet steel bars quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, and no extra for cutting to length. Rail steel bars range from 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Fabricators are well engaged and in some instances have enough tonnage on their books to carry them through the winter. The Pottstown, Pa., fabricating shop of the McClintic-Marshall Co. made a record output of steel in October, with more than 20,000 tons shipped. Despite the good volume of business in the market, fabricators' quotations and prices of plain material lack strength. The market on shapes ranges from 1.90c. to 2c., f.o.b. nearest mill to consumer, or 1.96c. to 2.06c., delivered Philadelphia. Occasionally the lower price is shaded on desirable business.

Plates.—Desirable tonnages have recently brought out concessions of $1 a ton from 2.05c. a lb., Coatesville, Pa., but the old price is being maintained by eastern Pennsylvania mills on most of the current small business. Some substantial plate business is in prospect, including 5000 tons or more for locomotives for the Pennsylvania Railroad to be built by the Baldwin Locomotive Works and in the railroad's shops at Altoona, Pa., and about 12,000 tons each for two passenger vessels for the United States Lines, bids on which will be opened Nov. 15.

Sheets.—Local consumers of sheets are providing only a small volume of business, but prices are substantially unchanged. Black sheets are generally quoted at 2.75c., base Pittsburgh, or 3.07c., delivered Philadelphia, but buyers of high-finished sheets say they are able to obtain reductions in the usual extras. Galvanized sheets are quiet at 3.50c., Pittsburgh, or 3.82c., Philadelphia. Blue annealed sheets are quoted at 2.35c., Pitts-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base

burgh, or 2.67c., Philadelphia, for No. 13 gage and blue annealed plates, No. 10 gage are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. To automotive and other preferred buyers, or when competition is encountered from the product of the continuous mill, concessions of about $2 a ton are offered.

Warehouse Business.—October buying was limited to small tonnages of material, but the total compared favorably with that of September, and in profits the month was one of the best of the year for certain jobbers. Effective Nov. 1, black and galvanized sheet prices were reduced $4 a ton to 3.90c. a lb., base, for black and 4.65c., base, for galvanized. On Nov. 2, cold-finished steel prices were reduced $2 a ton to 3.50c. a lb. for rounds and hexagons and 4c. for squares and flats.

Imports.—In the week ended Nov. 2, 615 tons of chrome ore arrived at this port from British South Africa and 76 tons of pig iron was received from Sweden. Steel arrivals consisted of 224 tons of structural shapes from Germany, 66 tons from Belgium and 11 tons from France, 45 tons of chrome steel rods from Sweden, 42 tons of steel bars from Belgium and 54 tons from Sweden, 4 tons of steel bands from Belgium, 48 tons of steel billets from Sweden, 17 tons of steel scrap from the United Kingdom and 4 tons from Germany.

Old Material.—Prices of all grades lack strength, but there have been no transactions of consequence with consumers to test the market. Mills are receiving heavy melting steel on old contracts and show no haste to cover future requirements. Machine shop turnings are off 50c. a ton to $11.50 a ton, delivered, and heavy breakable cast is not quotable at more than $14.50 a ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	22.75 to 23.25
No. 1 forge fire	14.00
Cast iron carwheels	16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Railroad Equipment

Missouri Pacific Inquiring for 2304 Cars

INQUIRIES appeared the past week for 125 locomotives of which 30 are for the Missouri Pacific, 30 for the St. Louis-San Francisco, 40 for the Rock Island and 25 for the Wabash. The Missouri Pacific also is asking for bids on 2304 cars. Although car orders have been light, there are total outstanding inquiries for 14,000 freight cars, for which contracts are expected to be placed before the end of the year. Details of the week's business follow:

Missouri Pacific will buy five Mountain type locomotives, 25 freight locomotives, 1250 50-ton box cars, 1000 70-ton hopper cars, 10 all-steel parlor coaches, six dining parlor cars, three dining-club cars and 35 steel underframe caboose cars.

Chicago & North Western has ordered 100 underframes from American Car & Foundry Co.

St. Louis-San Francisco will buy 30 Mikado type locomotives.

Rock Island is in the market for 40 4-8-4 locomotives.

Wabash is asking for prices on 25 4-8-4 type locomotives.

Nashville, Chattanooga & St. Louis has ordered five 4-8-4 type locomotives from the American Locomotive Co.

Newburgh & South Shore has placed an order for one six-wheel switching locomotive with the Baldwin Locomotive Works.

Baltimore & Ohio has ordered 50 passenger cars from the Pullman Car & Mfg. Corporation.

New York, Chicago & St. Louis has bought 10 caboose cars from the Canton Car Co.

Transcontinental Oil Co. is reported to have ordered 100 tank cars from the American Car & Foundry Co.

United Fruit Co. has ordered 100 banana cars and 80 superstructures from the Mayor Car Corporation.

Pittsburgh Iron and Steel Market

(*Concluded from Page* 1264)

coal quotations are very low on the average.

Old Material.—A weaker tone is in evidence in the scrap market this week, but No. 1 heavy melting steel is not quotable at less than last weeks' range of $17 to $17.50. A tonnage of railroad steel bought this week by a mill in the district brought within a few cents of the higher figure, but weakness is still shown by the ability of dealers to pick up scrap against recent orders at as low as $16.50. A small sale of hydraulic compressed sheets brought about $17, and this commodity is probably stronger at $16.75 to $17.25 than heavy melting steel at the higher figures. The lighter grades are quoted at unchanged prices. Specialties are fairly strong, as shipments to steel foundries are keeping up and business on the books of these companies promises a good operation over the remainder of the year. One large steel company has held up shipments against all its scrap contracts, and others are taking steel only in limited tonnages. This position is justified in view of the continued downward trend of open-hearth operations.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Production of Pig Iron and Steel in Canada

	September, 1929	August, 1929	September, 1928
Pig iron, gross tons	98,816	112,528(a)	90,516
Pig iron, gross tons, nine months	829,687	.....	745,473
Ferroalloys, gross tons	7,131	7,178	.....
Ferroalloys, gross tons, nine months	57,932	.....	23,414
Steel ingots, gross tons	93,584	113,422	.....
Steel ingots, gross tons, nine months	1,033,854	.....	.....
Steel castings, gross tons	5,416	6,860	.....
Steel castings, gross tons, nine months	54,097	.....	.....
Total steel, gross tons, nine months	1,087,951	.....	919,710

(a) High record production.

Beginning with January, 1930, the *National Waste Review* will be published monthly by the National Association of Waste Material Dealers, Times Building, New York. Beginning as a publication of about 60 pages, it will combine all the present publications of the association, including the Salvage and Reclamation Bulletin. The new publication will be available to members and non-members.

Pacific Coast

Pipe Line in Oregon Takes 2000 Tons of Plates—Structural Steel Market Continues Active

SAN FRANCISCO, Nov. 2 (*By Air Mail*).—Outstanding developments in the Pacific Coast iron and steel markets this week were the absorption by the United States Steel Corporation of the properties of the Columbia Steel Corporation, the award of 2000 tons of plates for a pipe line in Oregon, the placing of 800 tons of structural shapes for an office building addition in Los Angeles, and the letting of 1200 tons of reinforcing steel bars for a pulp plant addition at Camas, Wash.

Plans for the development of the Columbia properties by the Steel Corporation have not been announced, but it is said here that the Pittsburg, Cal., plant will be enlarged to twice its present capacity. Now that this deal has been consummated, more is heard on all sides regarding the possibility of the Pacific Coast Steel Co., with plants at Seattle, San Francisco and Los Angeles, selling out to an independent producer.

Pig Iron.—Demand for foundry pig iron has shown little sign of improvement. Upward of 2000 tons of Indian iron arrived recently. About two-thirds was taken by Los Angeles district melters and a third by San Francisco users. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Merchant bar steel demand remains quiet, with the majority of sales and inquiries involving small tonnages. Prices continue fairly firm at 2.35c., c.i.f., Coast ports. Important lettings included 1000 tons for a warehouse and 550 tons for a pier, both in San Francisco, and 1200 tons for a pulp plant addition for the Crown Willamette Paper Co., in Washington, all placed with the Pacific Coast Steel Co. A theater in Stockton, Cal., involving 150 tons, a nurses' home in Portland and a factory at St. Helens, Ore., the latter two involving 200 tons and 300 tons, respectively, were placed with the Truscon Steel Co. Pending business is of fair proportions, and new inquiries include 400 tons for a veterans' memorial at Yountville, Cal. No change in out-of-stock prices has occurred.

Plates.—Demand for plates has shown signs of improvement, and awards this week totaled more than 3000 tons. The Steel Tank & Pipe Co. took 2000 tons for a pipe line to be laid between Salem and Portland, Ore. The Willamette Iron & Steel Works booked 170 tons for a digester for the Crown Willamette Paper Co., Camas, Wash., and the Commercial Boiler Works secured 425 tons for five digesters for the Olympic Forest Products Co., Port Angeles, Wash.; 375 tons for drum gates and 550 tons for a penstock for the Lake Cushman dam project, Tacoma, Wash. No action has yet been taken on 1400 tons for the Everett, Wash., pipe line. Seattle is calling for bids on 370 tons for the Cedar River No. 2 pipe line. Prices are not firm at 2.35c., c.i.f.

Shapes. — Demand for structural steel shapes continues undiminished, and some fair-sized lots were placed during the week. The McClintic-Marshall Co. secured 335 tons for an apartment house in San Francisco; the Judson-Pacific Co. took 100 tons for a skating rink in Oakland, and the Consolidated Steel Corporation booked 800 tons for the California Bank addition, Los Angeles. Bids will soon be called for on 14,000 tons for the Lake Union bridge at Aurora Avenue, Seattle, and on 300 tons for an addition to the Southern Pacific Co.'s hospital in San Francisco. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Sales of cast iron pipe this week involved only two projects in excess of 100 tons. Los Angeles awarded P. P. Janich 100 tons of 4 to 10-in. Class B pipe for Olive Street, and San Diego placed 112 tons of 4 to 8-in. Class B pipe with the R. E. Hazard Contracting Co. for Estelle Street. The East Bay Municipal Utility District, Oakland, Cal., will open bids on Nov. 13 for 147 tons of 8 and 16-in. Class B and 150 pipe. The American Cast Iron Pipe Co. was low bidder on 261 tons of 6 and 8-in. Class B pipe for Burbank, Cal.

Steel Pipe.—Little of importance took place in the market for standard steel pipe, line pipe and oil country goods during the week. The Santa Fe Pipe & Supply Co. secured 243 tons of 1 to 8-in. black and galvanized steel pipe for Los Angeles.

Coke.—A shipment of 6000 tons of English beehive and by-product coke is due to arrive on the Coast about Jan. 5.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Canada

Spot Pig Iron Buying in Good Volume

TORONTO, Ont., Nov. 4.—Spot pig iron buying continues in good volume in the Canadian markets. Melters are taking in large shipments. Forward buying has virtually ceased, most melters who buy in this way being covered to the end of the year. There has been very little curtailment in the daily iron melt. Foundries are mostly running close to capacity. Local blast furnace representatives point out that business is about 10 per cent in excess of that done last year. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While the demand for building steel is on the decline, fabricators are still carrying large tonnages of unfilled orders, and all plants are running at capacity. Shipments on contract account are at a high average, and there is sufficient new business, in small tonnages, to maintain good shipments on spot account.

Old Material.—Mills continue to buy sparingly, with the result that the demand for steel grades is quiet both in the Toronto and Montreal markets. Iron grades have a steady call, but tonnages involved are smaller than those of a month or six weeks ago. Dealers are accumulating supplies against winter needs. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Boston

Pig Iron Sales for Week Not More Than 3000 Tons—Scrap Buyers Staying Out of Market

BOSTON, Nov. 5.—With the gyrations of the stock market uppermost in the minds of most people, scant attention was given to pig iron the past week. Sales, most of them in car lots, in the aggregate did not exceed 3000 tons, and were fairly well divided among the Mystic Iron Works, Buffalo, and New York and Alabama stacks. It is more apparent that fairly recent sales by Alabama furnaces were sufficiently large to take care of some melters' requirements until Jan. 1 at least. It is now reported that the Rhode Island melter that bought 1000 tons of malleable iron paid less than the equivalent of $17 a ton, Buffalo.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.55	$22.05
†Buffalo, sil. 2.25 to 2.75	22.05	22.55
*Buffalo, sil. 1.75 to 2.25	22.41	22.91
*Buffalo, sil. 2.25 to 2.75	22.91	23.41
East. Penn., sil. 1.75 to 2.25	22.65	23.15
East. Penn., sil. 2.25 to 2.75	23.15	23.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		24.11
*Ala., sil. 2.25 to 2.75		24.61
†Ala., sil. 1.75 to 2.25		20.25
†Ala., sil. 2.25 to 2.75		20.75

Freight rates: $4.91 all rail from Buffalo, and $4.05 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Current buying of pipe is largely private and in car lots. The Warren Foundry & Pipe Co. will furnish 150 tons of 6 and 8-in. pipe for a State job at Westfield, Mass., the largest individual order of the week. The Watertown Arsenal will close bids Nov. 7 on 100 tons of pipe and fittings. Indications are that welded steel pipe will be used for the Associated Gas & Electric Co.'s 25-mile line between Sherborn and Shrewsbury, Mass. Because of the sizable tonnages placed the past month in the New York territory, foundries are holding prices more firmly in New England. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe. Imported pipe has not been much of a factor in this market of late.

Warehouse Business. — Following the recent cut of 20c. a keg in wire nail prices, the market has recovered 5c., making the stock price $3.25 a keg, base. In car lot shipments from mill the base price is $2.50 a keg, and less than car lots, $2.75. Staples and other wire products also have been advanced 5c. per 100 lb. Individual orders for iron and steel placed with warehouses continue small, but the weekly aggregate tonnage involved is representative. Prices remain more or less unsettled owing to keen competition for business.

Old Material.—The feature of the old material market the past week was the announcement that a steamer will start to load 3000 tons here Nov. 5, presumably for Danzig, and that between Nov. 15 and 20 another steamer will load 3000 to 3500 tons for Czechoslovakia. Pennsylvania steel mills are still staying out of the market, and owners of scrap are not interested in prevailing prices; consequently the market is more or less deadlocked.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.75	$11.25
Scrap T rails	10.50	10.75
Scrap girder rails	9.50	10.00
No 1 railroad wrought	10.50	11.00
No. 1 yard wrought	9.00	9.50
Machine shop turnings	6.50	7.00
Cast iron borings (steel works and rolling mill)	6.00	6.50
Bundled skeleton, long	9.00	9.50
Forge flashings	9.50	10.00
Blast furnace borings and turnings	6.00	6.25
Forge scrap	8.50	9.00
Shafting	14.00	14.25
Steel car axles	17.50	18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00	9.50
Rails for rolling	12.00	12.50
Cast iron borings, chemical	9.50	9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00	$14.50
No. 1 machinery cast	15.00	15.25
No. 2 machinery cast	13.00	13.25
Stove plate	11.00	11.50
Railroad malleable	18.50	19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Birmingham

Steel Business Continues Fairly Good—21 of 23 Open-Hearths in District Active

BIRMINGHAM, Nov. 4.—The pig iron market has experienced another quiet week. Liberal orders for the fourth quarter, placed some weeks ago by many local consumers, have taken care of their probable requirements, so current sales are confined largely to foundries that usually buy on a hand-to-mouth basis. Inquiries are light. Furnace interests have given no indication as to when books will be opened for the first quarter. A further reduction in stocks was effected during October by the large shipments on previous sales to Eastern and Middle Western points. Quotations remain firm at $14.50. No change in furnace operations has occurred in the past three weeks. Of the 15 active furnaces, seven are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—There was a slight increase in backlogs during October despite the high rate of mill operations. Backlogs are sufficient to extend operations into December at the present rate without the addition of further tonnage. The present activity in bars, plates and structural shapes has been unequaled for some time. The sheet business is considered extra good for this time of the year. Specifications on contracts continue at a brisk rate. Tonnage on books of structural steel fabricators is the best in several weeks. New bookings of the Virginia Bridge & Iron Co. include 1400 tons for the Louisiana Steam Products power plant at Baton Rouge, La., and 860 tons for a passenger station for the Nashville, Chattanooga & St. Louis Railway Co. at Atlanta, Ga. Twenty-one of the 23 open hearths in the district are active.

Cast Iron Pipe.—Several good tonnages are up for awards, but buyers are slow in placing contracts. Tonnages for which bids were opened last week and other contracts still pending include 4000 tons for Dallas, Tex.; 2000 tons for Kansas City, Mo.; three miles of 8 to 12-in. pipe for Murfreesboro, Tenn., and small projects at Dayton and Jonesboro, Tenn. Inquiries have been received on two or three fair-sized projects for distant points. Backlogs were greatly reduced during October, and immediate tonnage is needed in some cases to support operations. Prices are unchanged from $37 to $38, base, for 6-in. and larger diameters.

Coke.—New business in the foundry coke market has been quiet for several weeks. Shipments on contracts are steady. Prices are unchanged.

Old Material.—There was a marked drop in the volume of new business

last week. This was felt mostly in the steel grades, as iron scrap was already inactive. There are no changes in quotations, the steel lines being fairly firm and iron very soft.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to	$13.50
Scrap steel rails		14.00
Short shoveling turnings		9.00
Cast iron borings		9.00
Stove plate	11.50 to	12.00
Steel axles		21.00
Iron axles		23.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		15.50
No. 1 cast		13.00
Tramcar wheels		12.50
Cast iron carwheels	13.00 to	13.50
Cast iron borings, chem.	13.50 to	14.00

Youngstown

Valley Mills on Lowest Schedules of Year

YOUNGSTOWN, Nov. 4.—For the first full week in November, operating schedules of Mahoning Valley steel companies are the lowest of the year, though losses in some directions are offset by gains in others. Tinplate schedules, for example, which declined to 60 per cent, have rebounded and are reported at 75 per cent. The Republic Iron & Steel Co. has started its tin mills at Leavittsburg, which have been idle. Steel bar output by the independents has gained to between 70 and 75 per cent, while 15 of 21 pipe mills are working. Tinplate buying for the first half of 1930 is expected to start in November.

The Carnegie Steel Co. has blown out No. 1 blast furnace in its Ohio Works group, leaving three of six in this complement in blast, and reducing the number of active furances in the Youngstown district to 25, of 35.

Of 51 independent open-hearth furnaces, 27 are scheduled, the smallest number in 15 months. Of 120 independent sheet mills, 79 are scheduled, and some of these only part time. The Sharon Steel Hoop Co. is again operating nine sheet mills, which have been idle, but losses in other directions produce a net loss for the district in sheet mill schedules.

The Republic Iron & Steel Co., because of business conditions, has deferred plans for installation of three additional sheet mills at its Warren works, to replace two jobbing units. The company now operates seven sheet mills at Warren and 18 at Niles. A number of sheet mills at the Warren plant have been converted into tin mills.

Average production for the district is not above 65 per cent.

Tonnage rates paid sheet and tin mill workers in Midwestern mills continue unchanged for November-December, as compared with the September-October rate, as a result of the bimonthly examination of sales sheets. The average selling price of Nos. 26, 27 and 28-gage black sheets shipped by subscribing mills for the 60 days ending Oct. 31, was disclosed at 3.05c. a lb., or unchanged from the preceding examination.

St. Louis

Missouri Pacific Orders 61,000 Tons of Rails—Scrap Buying Comes to a Standstill

ST. LOUIS, Nov. 4.—The past week was quiet in the pig iron market. The St. Louis Gas & Coke Corporation sold 1400 tons, including 1000 tons of malleable, to a local melter for first quarter delivery, and four 100-ton lots of foundry iron for prompt shipment, including 100 tons of special iron to a Nashville, Tenn., melter. Shipments by the local maker totaled 32,000 tons in October, about equal to September shipments. Southern iron sales for the week were between 1000 and 1200 tons, including three orders of 300 tons each. Books of Southern makers for first quarter have not been opened, but there is some talk of naming a base price of $14.50, Birmingham. Production by stove manufacturers is said to be about one-third greater than a year ago, plants here and at Belleville, Ill., working at full capacity. The implement trade also is said to be improving.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to	$20.00
Malleable, f.o.b. Granite City		20.00
N'th'n No. 2 fdy., deliv'd St. Louis		22.16
Southern No. 2 fdy., deliv'd	16.92 to	18.92
Northern malleable, deliv'd		22.16
Northern basic, deliv'd		22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Rails.—The Missouri Pacific Railway has purchased 61,000 tons of 110-lb. and 90-lb. rails for 1930 use. It is understood that the tonnage was divided among the Illinois Steel Co., Colorado Fuel & Iron Co., Tennessee Coal, Iron and Railroad Co. and Inland Steel Co. on approximately an equal basis.

Finished Steel.—The Granite City Steel Co. reports that all units are operating at full capacity, and that enough business has been booked to operate the plate and galvanized sheet mills four weeks and blue annealed department about three weeks. The Laclede Steel Co. received the contract for 1700 tons of reinforcing bars for a building at Randolph Field, San Antonio, Tex., but there is no business of consequence pending locally for either reinforcing bars or structural steel.

Coke.—The demand for domestic coke is heavy, dealers buying more freely as their piles are reduced by demands resulting from colder weather. Industrial grades are in good demand.

Old Material.—Buying by consumers in the St. Louis district, which has been exceedingly light in the last few weeks, was brought to a stop early last week, purchasing agents reporting that they had been instructed to buy no more until the conditions in the stock market had become settled. Dealers also have been asked in some instances to withhold shipments against contracts, and cancellations have been received for most shipments due on expired contracts. Dealers are buying only against contracts. The amount of distress material is said to be small. Heavy melting steel is down 50c. a ton. Railroad lists: Pennsylvania, 53,360 tons; Baltimore & Ohio, 23,015 tons; Missouri-Kansas-Texas, 250 tons; Missouri Pacific, 122 carloads; Mobile & Ohio, 17 carloads; St. Louis Southwestern, 15 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to	$13.50
No. 2 heavy melting or shoveling steel	12.50 to	13.00
No. 1 locomotive tires	15.00 to	15.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.50 to	15.00
Railroad springs	16.50 to	17.00
Bundled sheets	10.00 to	10.50
No. 2 railroad wrought	13.50 to	14.00
No. 1 busheling	9.75 to	10.25
Cast iron borings and shoveling turnings	9.25 to	9.75
Iron rails	13.00 to	13.50
Rails for rolling	15.25 to	15.75
Machine shop turnings	7.25 to	7.75
Heavy turnings	9.50 to	10.00
Steel car axles	19.00 to	19.50
Iron car axles	27.00 to	27.50
Wrot. iron bars and trans.	21.50 to	22.00
No. 1 railroad wrought	13.00 to	13.50
Steel rails, less than 3 ft.	17.50 to	18.00
Steel angle bars	14.00 to	14.50
Cast iron carwheels	14.00 to	14.50
No. 1 machinery cast	15.25 to	15.75
Railroad malleable	14.50 to	15.00
No. 1 railroad cast	14.50 to	15.00
Stove plate	12.00 to	12.25
Agricult. malleable	14.00 to	14.50
Relay. rails 60 lb. and under	20.50 to	23.50
Relay rails 70 lb. and over	26.50 to	29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.10c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Hudson Valley Fuel Corporation is the name adopted for the former Hudson Valley Coke & Products Corporation, Troy, N. Y., which recently was purchased by the Niagara & Hudson Power Co. The Hudson Valley company owns a blast furnace and by-product coke ovens at Troy.

Buffalo

Southern Pig Iron Competition in East Affects New York State Furnaces—Scrap Market Dull

BUFFALO, Nov. 4.—The market for pig iron is very quiet. The largest order placed here during the past week was for 600 tons of foundry. Several lots of 100 tons each have been taken for district and Eastern delivery. Placing of Buffalo iron in the East has been somewhat disturbed by the competition of Southern furnaces, which have been quoting an equivalent of $16, Buffalo, and taking a good deal of the business that has been offered. One furnace lost in competition more than 10,000 tons to Southern furnaces in the past month. Most of the iron taken is for prompt shipment. First quarter books have not been opened, except that buyers have been told, in some instances, that they will be carried along for first quarter requirements. Shipments are remarkably good.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Operation of Buffalo mills continues at last week's gait. The Lackawanna plant of the Bethlehem Steel Co. is operating 20 open-hearths and Donner Steel Co. is down to four. The Seneca Iron & Steel Co. is at approximately 70 per cent of capacity.

Old Material.—Buying has slackened to a minimum, although the market seems to have steadied and is no softer than a week ago. One of the large plants has practically suspended shipments, and this condition is now expected to prevail until Nov. 15. On shipments to another large plant, rejections are becoming very common. While mill operations have fallen off to some extent, stocks of scrap in dealers' yards are said to be only fair. A few sales of No. 1 machinery cast and rolled steel wheels have been made at the market. Production of scrap, due to lessened operation of automobile plants, has fallen off accordingly.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex. Rounds	4.45c. 3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $16.00
No. 2 heavy melting steel	13.50 to 14.50
Scrap rails	15.00 to 15.50
Hydraul. comp. sheets	13.50 to 14.50
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.75 to 14.00
No. 1 busheling	13.50 to 14.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	11.25 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings	11.25 to 11.75
Cast iron borings	11.25 to 11.75
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	15.00 to 15.50
Stove plate	12.50 to 12.75
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	18.75 to 19.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Industrial	17.50 to 18.00
Railroad	17.50 to 18.00
Agricultural	17.50 to 18.00
Special Grades:	
Chemical borings	12.50 to 13.50

Detroit

Further Recession in Automobile Output Over Remainder of the Year Is Expected

DETROIT, Nov. 4.—Whatever hopes the automobile industry may have entertained for a gradual recovery in the volume of motor car buying during the remainder of the year have been dissipated by the recent events in Wall Street.

Automobile manufacturers generally are revising production schedules downward to meet new sales conditions. Some motor car companies now have no definite schedules for this month and next, and are operating on a hand-to-mouth basis and cutting inventories to the bone. They anticipate a general reaction from the stock market collapse which will affect sales of new cars.

While there would have been some year-end shutdowns for inventory under any circumstances, the present situation is believed to have hastened such cessation of productive activities. A number of automobile manufacturers have temporarily shut down some units. This includes at least one body plant and some foundries.

The Ford Motor Co. schedule this week is 7600 motors per day for five days. The Chevrolet Motor Co., which had a schedule of 150,000 cars for November-December, is said to have cut this to about 50,000 for the two months. Steel and parts had been ordered for the original schedule, and suspension orders have been sent to the steel companies and parts manufacturer which were to have supplied the material.

The view of some sales executives of automobile companies is that sales of new cars over the remainder of the year will be at low ebb.

The Ford Motor Co. last week advertised a reduction in the prices of its cars, and at the same time lowered the discount to dealers from 20 per cent to 17½ per cent, the effect of which is that the dealers must absorb half of the reductions.

The low production schedules of automobile manufacturers have brought a corresponding decrease in the output of iron and steel scrap. The old material being released is no more than enough to cover current orders. Prices are unchanged, though the market is weak.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.75 to 12.25
Old No. 1 busheling	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

Great Lakes Steel Orders Electrical Equipment

The Great Lakes Steel Corporation, Detroit, now a part of the National Steel Corporation, has placed orders for the greater part of the electrical equipment for its new steel plant. The General Electric Co. will supply for the drive for the 20-in. mill three 5000-kw., 600-volt motor generator sets, one 1200, one 1600, one 2200, one 3000 and six 2000 hp. motors with necessary control equipment, and for the 14-in. mill one 5000-kw. motor generator set, four 1000, two 2000 and one 1600 hp. motors with control equipment. This company will also furnish two 2000 hp. d.c. motors, a.c. general purpose motors and small mill type motors. The Westinghouse Electric & Mfg. Co. will furnish a 7000-hp. reversing motor for the blooming mill, two 2000-kw., 250-volt d.c. motor generator sets, one 2000 kva. transformer and a 4000 and 5000 hp. synchronous motor. Direct current motors for general purposes will be supplied by the Reliance Electric & Mfg. Co. The Cutler-Hammer Co. will supply the control equipment for the cranes.

International Acetylene Association, in its meeting scheduled for Nov. 13 to 15 at Congress Hotel, Chicago, will listen to series of papers on aircraft construction, cutting and welding of structural steel, welded piping, and testing of welds.

Cincinnati

Pig Iron, Coke and Scrap Quiet—Marked Slackening in Demand from Automobile Foundries

CINCINNATI, Nov. 4.—The district pig iron market is quiet and featureless. Sales during the last week about equaled those of the preceding week, approximately 2500 tons being the total reported. While this tonnage is not unusually small for the middle of the quarter, the fact that district consumers did not buy in the usual quantities at the opening of the quarter is causing concern to furnace representatives. A marked slackening in the demand from automobile foundries is noted, while on the other hand jobbing foundries are taking iron at about the usual rate, but they are not anticipating their requirements for any length of time. The largest order last week was for 600 tons of Northern foundry iron from a central Indiana consumer, while the remainder of the week's business was in small lots. Price schedules are steady, with Northern iron at about $18.50, base Lake furnace, and Southern iron at $14 to $14.50, base Birmingham. Inquiry is small.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Current orders for sheets are almost entirely for immediate needs. The nearness of inventory periods is causing buyers to hesitate in anticipating their needs for any length of time. The demand for galvanized sheets is still good, but mill operators express dissatisfaction with the price situation, current schedules not being high enough to insure good profit in competitive markets where concessions are imperative to obtain business. Backlogs are shrinking daily and deliveries are almost immediate.

Coke.—The coke market reflects the same situation as the pig iron market. Specifications for by-product foundry coke from automobile foundries are noticeably off, while specifications from other consumers are being sustained at a fair rate. With virtually all consumers under contract for the remainder of the year, new business is light.

Old Material.—While there is virtually no activity in the scrap iron and steel market, price schedules have not changed in the last week. While there is no superabundance of steel scrap, the light grades are in better supply than the heavy grades. Dealers are buying carefully and are not accumulating stock. Consumers, too, are taking scrap only as it is needed.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings	8.75 to 9.25
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.25 to 14.75
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.75 to 19.25
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

To Investigate Working Week in Industry

Census to Disclose Number of Days in Normal Plant Week; Also Industrial Migration

WASHINGTON, Nov. 5.—Marking the first time such information has been sought, the Census of Manufacturers to be taken early in 1930 will require manufacturers to state their practice with respect to the number of days that constitute the normal working week of their plants. There has been much speculation during the past two or three years on this subject and the advisory committee on the Census of Manufactures, headed by Col. L. S. Horner, president, Niles-Bement-Pond Co., New York, has announced its purpose to obtain exact facts of a nation-wide scope.

Manufacturers will be asked not only to state whether their plants are on a six, five-and-one-half or a five-day basis per week but also to indicate the number of shifts per day and hours of labor per week. There will be the usual questions on the number of wage earners and salaried persons, the seasonal variations of employment in lines of manufacturing that can be measured and on the growing use of power and power equipment.

As has been previously announced, migration of industry will be the subject of an inquiry that will be made for the first time. Movements of manufacturing that have been under way during the past decade have resulted in decreases in the requirements for skilled labor in one section of the country accompanied by increases in requirements for the same type of labor in other parts of the country. Again, a trend of manufacturing away from established centers and from the large cities has been reported. Such a diffusion of manufacturing, it was pointed out, would have an influence on the employment conditions surrounding industry. The purpose of the new census inquiry is to obtain reliable data on the subject.

The employment of women in industry again will be the subject of inquiry. While these data were available in the reports of previous decennial censuses, the employees in factories have not been divided according to sex since 1919 in the biennial censuses. Great changes other than geographical relocations have occurred in industry during the decade. Mechanization has brought about shifts in the character of workers required. It is desired to learn whether these changes have tended to increase or decrease the number of women in factories.

Blank forms for the forthcoming census will be distributed to the manufacturers early next year. The committee is interested in plans to bring about more expenditious and accurate completion of the schedules by manufacturers and prompt tabulation and publication of the data by the Bureau of Census. It therefore is seeking the cooperation of manufacturers.

Court Will Not Enjoin Interstate Steel Sale

Circuit Judge Philip L. Sullivan, at Chicago, has refused to grant an injunction restraining the sale of the Interstate Iron & Steel Co. to the Central Alloy Steel Corporation. Benjamin M. Morris, an attorney, brought suit on the ground that the deal constituted a merger of a type forbidden under Illinois laws. Judge Sullivan ruled that the complainant did not produce evidence that the stock transfer constituted a merger. The attorney said he would appeal from this decision.

Non-Ferrous Metal Markets

Further Decline in Lead and Zinc—Tin at New Low Level Since 1923—Copper Unchanged

NEW YORK, Nov. 4.

Copper.—There has been some improvement in copper buying from abroad, but very little in domestic demand. Sales for export have improved the last week, orders today totaling more than 1000 tons. Domestic consumers are buying as little as they can, which is not much, because orders received by fabricators are not coming in rapidly. October was one of the poorest months in some time in actual sales, those for export being estimated at not over 30,000 tons, while those for domestic shipment were considerably below totals which have lately been regarded as normal. It is reported that there will be further curtailment of production at the mines, supplementing that which occurred some months ago. The only bright spot in the picture is the fact that the price of copper is steady and it is the only one of the major non-ferrous metals which has not changed during the collapse of the stock market. Foreign consumers are now in a position where they will have to buy November metal. Domestic consumers are not covered for all of their November needs. They probably will not purchase much December metal until conditions are more settled. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and the official quotation of Copper Exporters, Inc., is still 18.30c., c.i.f., usual European ports. Lake copper is unchanged at 18c. to 18.12½c., delivered.

Copper Averages.—The average price of Lake copper for October, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—Buying has been very light, with only about 200 tons of spot Straits tin sold for the week ended Nov. 2, the smallest for any week in a long time; of this 150 tons was sold on Nov. 1. Neither consumers nor dealers are showing interest, and the market is closely following fluctuations in London. When the Bank of England on Oct. 31 reduced its rediscount rate, tin prices shot up over £4 per ton, and the New York market also was stronger. With the announcement of October statistics on Nov. 1, the London market fell more than £3 at

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 4	Nov. 2	Nov. 1	Oct. 31	Oct. 30
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	40.12½	....	40.75	41.75	41.25
Zinc, East St. Louis	6.50	6.50	6.50	6.50	6.60
Zinc, New York	6.85	6.85	6.85	6.85	6.95
Lead, St. Louis	6.35	6.35	6.35	6.35	6.55
Lead, New York	6.50	6.50	6.50	6.50	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rol's ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	42.50c. to 43.50c.
Tin, bar	44.50c. to 45.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 9.75c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	28.50c. to 29.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	45.75c.
Tin, bar	47.75c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.15c. to 7.35c.
Lead, bar	9.25c
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	50.00c.
Solder, ½ and ½	29.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.25c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.75c.	13.75c.
Brass, heavy	8.25c.	9.25c.
Brass, light	7.00c.	8.00c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.25c.	15.50c.
Cast aluminum	11.75c.	13.75c.

the opening, with another break of £3 per ton later in the day. The statistics show an estimated increase in the world's visible supply of 1022 tons. Straits shipments which were estimated at 10,000 tons, turned out to be only about 8000 tons. There was thus a large amount of tin carried over. Supplies in the East, plus the estimated production, totaled upward of 14,000 tons available for shipment. This situation was the real cause of the break in London. Sales of tin in the East have been heavy in the last five days, totaling 1575 tons from Oct. 30 to Nov. 4, inclusive. London prices today were low at £181 15s. for spot standard, £185 for future standard and £185 15s. for spot Straits. The Singapore price today was £187. All of these prices are about £3 a ton lower than those of a week ago. In a very dull market, spot Straits tin was quoted today at 40.12½c., New York, the lowest level since Aug. 24, 1923.

Lead.—Another reduction was made on Oct. 31 by the American Smelting & Refining Co. in its New York contract price from 6.75c. to 6.50c., New York. With the first reduction made a week ago, the total decline in three days has been $8 a ton, or from 6.90c. to 6.50c. The decline has been largely due to lower prices in London, which reflect increased output and poor demand. Buying here has naturally been very light and consumers are awaiting developments. The quotation of the leading producer at St. Louis is now 6.35c.

Zinc.—Owing to further declines in London, the quotation for prime Western zinc declined on Oct. 31 from 6.60c. to 6.50c., East St. Louis, or 6.85c., New York. Naturally, buyers continue very cautious, and the market is by no means active. Sales for November delivery have been light, but it is felt that some buying must materialize soon. Even hand-to-mouth buying should be larger than it is.

Antimony.—Some antimony was sold during the week by holders, who apparently had to sacrifice it at 8.37½c., New York, duty paid. This has slightly unsettled quotations, which are now 8.62½c. for spot and 8.75c. for futures.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 4.—Prices for these commodities have fluctuated rapidly in the last week and quotations with the exception of copper are lower. Sales of both new and old metals are in small volume.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41.37½c.; lead, 6.45c.; zinc, 6.60c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Lettings Amount to Only 22,500 Tons—Inquiries Include 14,000 Tons for Seattle Bridge

CONTRACTS placed for structural steel the past week totaled only 19,000 tons, as against 55,500 tons the previous week. The major portion of the tonnage will go into structures for industrial purposes. The largest award was 3300 tons for a department store at Akron, Ohio. Approximately 23,000 tons has been added to prospective business on which bids have been asked. Fourteen thousand tons is for a highway bridge at Seattle, Wash. Awards follow:

BOSTON, 146 tons, health unit, to New England Structural Co.

STATE OF CONNECTICUT, 400 tons, highway bridge, to American Bridge Co.

NEW YORK, 700 tons, bridge for New York Rapid Transit Commission on East Fourteenth Street, Brooklyn, to American Bridge Co.

NEW YORK, 900 tons, apartment house at Lexington Avenue and Eightieth Street, to Easton Structural Steel Co.

PHILADELPHIA, 1500 tons, building for Girard College, to Bethlehem Construction Co.

VIRGINIAN RAILWAY, 100 tons, car parts, to Virginia Bridge & Iron Co.

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILROAD, 850 tons, bridge, to Virginia Bridge & Iron Co.

BATON ROUGE, LA., 1400 tons, power plant for Louisiana Steam Products, Inc., to Virginia Bridge & Iron Co.

ATLANTA, GA., 860 tons, Union station for Nashville, Chattanooga & St. Louis Railway Co., to Virginia Bridge & Iron Co.

AKRON, OHIO, 3300 tons, Polsky department store, to Berger Iron Works.

DETROIT, 1350 tons, plant for Kelsey Hayes Wheel Co., to Whitehead & Kales Co.

WHITING, IND., 150 tons, building for Standard Oil Co., to Vierling Steel Works.

HARRISBURG, PA., 1750 tons, Farm Show building, to Shoemaker Bridge Co.

NORTHERN PACIFIC, 1100 tons, bridge work, of which 250 tons was taken by McClintic-Marshall Co. and the remainder by an unnamed bidder.

ROCK ISLAND RAILROAD, 300 tons, truss span, to American Bridge Co.

CHICAGO, 900 tons, first section Lawson Memorial Y.M.C.A. building, to American Bridge Co.

CHICAGO, 1400 tons, Ruth Garage, to Gage Structural Steel Co.; previously reported to American Bridge Co.

OMAHA, NEB., 450 tons, steel for Union Station, to Omaha Steel Works; this is in addition to previous tonnages.

OMAHA, 350 tons, Thirteenth Street viaduct, to American Bridge Co.

LAMAR, COLO., 700 tons, highway bridge, to Minneapolis Moline Power Implement Co.

OAKLAND, CAL., 100 tons, skating rink on Grove Street, to Judson-Pacific Co.

SAN FRANCISCO, 335 tons, apartment building on Union Street, to McClintic-Marshall Co.

SALINAS, CAL., 109 tons, two bridges over San Lorenzo and Pancherico Creeks, to an unnamed bidder.

LOS ANGELES, 800 tons, California Bank building addition, to Consolidated Steel Corporation.

ST. HELENS, ORE., 475 tons, plant for Fir-Tex Insulating Board Co., to Truscon Steel Co.

PORTLAND, ORE., 2000 tons plates, pipe line between Portland and Salem, to Steel Tank & Pipe Co.

CAMAS, WASH., 170 tons plates, digester for Crown Willamette Paper Co., to Willamette Iron & Steel Works.

TACOMA, WASH., 375 tons plates, drum gates for Cushman Dam project, to Commercial Boiler Works.

TACOMA, 550 tons plates, penstock for Cushman Dam project, to Commercial Boiler Works.

PORT ANGELES, WASH., 425 tons plates, five digesters for Olympic Forest Products Co., to Commercial Boiler Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WELLESLEY, MASS., 300 tons, college administration building.

GARDNER, MASS., 118 tons, theater.

BOSTON & MAINE RAILROAD, 500 tons, bridges.

NEW YORK CENTRAL RAILROAD, 200 tons, bridge at Nyack, N. Y.

NEW YORK, 2000 tons, apartment house at 201-209 East Seventy-eighth Street.

STATE OF PENNSYLVANIA, 200 tons, highway bridges.

PITTSBURGH, 500 tons, Falk Chemical Laboratory for University of Pittsburgh; Stone & Webster, Inc., general contractor.

PITTSBURGH, 290 tons, addition to Taylor Allderdice High School; Williams & Haas, general contractors.

TOLEDO, 650 tons, building for Electric Auto-Lite Co.; bids taken.

CLEVELAND, 300 tons, East Seventy-ninth Street bridge for Nickel Plate Railroad.

MAYWOOD, ILL., 400 tons, public school.

MADISON, WIS., 600 tons, mechanical engineering building for University of Wisconsin.

CHEYENNE, WYO., 1200 tons, highway bridge across Canadian River.

SAND SPRINGS, OKLA., 900 tons, highway bridge.

SEATTLE, 370 tons plates, Cedar River pipe line No. 2; bids Nov. 4.

SEATTLE, 14,000 tons, Lake Union bridge on Aurora Avenue; bids soon.

SAN FRANCISCO, 300 tons, addition to Southern Pacific Co. hospital; bids soon.

ALAMEDA, CAL., 175 tons, hangar; bids being taken.

Tramrail Company Conducts Sales Training Class

Saturday, Oct. 19, marked the close of the fifth annual sales training class for dealers and dealers' salesmen, held by the Cleveland Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The class was given a week's instruction in the tramrail overhead method of lifting and conveying materials. The first two days were devoted to intensive instruction in the plant and office, supplemented by stereopticon slides of various tramrail installations. Two days were then spent in an inspection trip to industrial plants, where tramrail installations were seen under actual operating conditions. Then further instruction was given at the Cleveland Tramrail plant, followed by a banquet Friday evening. The sales training classes are in charge of A. F. Anjeskey, sales manager of the Tramrail Division.

Chicago-Milwaukee Rate Reduction is Opposed

WASHINGTON, Nov. 5.—Briefs for and against the proposed reduced rate of 8c. a 100-lb., 80,000-lb., minimum carload on iron and steel products from the Chicago switching district to the Milwaukee, Kenosha and Racine, Wis., districts have been filed with the Interstate Commerce Commission. The present rate is 9.50c., 36,000-lb., minimum carload. The carriers, which have filed the new schedules, now under suspension, declared that if the commission disapproved the 8c. rate large tonnages will move by water. They further contended that the rate has been shown to be remunerative.

A brief for the Green Bay Association of Commerce, the Northwest Engineering Corporation, Morley Murphy and other protestants in the Green Bay district declared that the proposed rate is less than a reasonable maximum, and that it would be unduly preferential of Milwaukee, Kenosha and Racine and unduly prejudicial to Green Bay and intermediate territory. The Green Bay brief said that the purpose of the railroads is to hold present steel tonnage, and that they had claimed that if the lower rate is not permitted to go into effect 20,000 tons will move annually by Lake Michigan from the Gary district to Milwaukee.

A brief for the East Side Manufacturers' Association, East St. Louis, Ill., and the Granite City Steel Co., Granite City, Ill., said that water competition such as to be a controlling influence in the reduction of the present rate has not been proved. If there is a possibility of the use of water transportation, the brief continued, the rail carriers are not justified in attempting to eliminate it. The reduced rate, it was contended, would bring about undue prejudice and unjust discrimination against shippers in the East St. Louis district and would be a severe departure from the rates approved in general steel case, affecting new rates throughout Official Classification territory. The products that would be affected by the reduced rate are structural material, plates, sheets and strip steel.

Inland Steel Earnings Gain in Third Quarter

The Inland Steel Co. reports a consolidated net income, after all charges, for the three months ended Sept. 30, of $3,158,967, equal to $2.63 a share on 1,200,000 shares of common stock. This compares with $3,126,909, or $2.60 a share, in the preceding quarter, and $2,089,439, or $1.74 a share, in the third quarter of 1928. Net income, after all charges, for the first nine months of this year totals $9,293,118, equal to $7.74 a share on the common stock. In the first nine months of 1928, this company earned $5.53 a share on the common stock. The directors have declared the regular quarterly dividends of 87½c. on the common stock and $1.75 a share on the preferred stock.

The Wheeling Steel Corporation, Wheeling, W. Va., had net profit in the quarter ended Sept. 30 of $1,775,382. Net earnings for the first nine months of the year amounted to $5,912,919 after depreciation and provision for taxes, as compared with $3,963,009 in the same period of 1928. The regular dividend of 1 per cent on common stock was declared.

By-Products Coke to Buy Three Furnace Companies

Stockholders of the By-Products Coke Corporation have voted an increase in the capitalization of the corporation from 800,000 shares to 2,500,000 shares. The proceeds from the sale of about 1,200,000 shares of stock will be used to acquire the Toledo Furnace Co., Toledo, Ohio, the Zenith Furnace Co., Duluth, Minn., and the Perry Iron Co., Erie, Pa. An interest in the ore properties of Pickands, Mather & Co. will also be purchased.

Hard Surfacing Alloy

An alloy welding rod for surfacing worn parts or new parts which must endure severe abrasion has been developed by the Oxweld Acetylene Co. It is called Hascrome and is a manganese-chromium-iron combination. It should be welded to a clean steel surface with an oxy-acetylene flame containing an excess of acetylene; the feathery cone indicating excess acetylene may be from half to fully as long as the inner cone of a truly neutral flame. Molten Hascrome absorbs carbon from this flame and its hardness is dependent upon the carbon absorbed and the rate of cooling. If quenched in water it is softer than if slowly cooled, in this being similar to other austenitic alloy steels developed for anti-corrosion and high-temperature uses.

Brinell Hardness of Hascrome

Fused with small excess of acetylene:	Brinell Hardness
Slowly cooled	250 to 300
Quenched	240 to 290
Heavy excess of acetylene:	
Slowly cooled	450 to 500
Quenched	350 to 450

The deposited metal has a tensile strength of about 40,000 lb. per sq. in., and can be forged hot but not machined when cold.

While the metal thus has a considerable degree of hardness, it is recommended primarily as an intermediate layer between steel and stellite. Frequently parts are worn so badly that the cost of sufficient stellite to bring the item back to shape is greater than that of a replacement part. In such an event, the less expensive Hascrome may be used for the bulk of the volume, finishing off with a relatively thin layer of the more durable stellite. It is said that the two are easily welded together, and that Hascrome has sufficient strength to prevent a mushrooming effect under impact.

The Central Alloy Steel Corporation, Massillon, Ohio, has placed in operation at its Canton plant a new electric induction reclaiming furnace for the reclaiming of stainless steel scrap.

COMING MEETINGS

NOVEMBER

Open-hearth Committee of American Institute of Mining and Metallurgical Engineers. Nov. 5 and 6. Annual meeting, Hotel Stevens, Chicago. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, chairman.

International Acetylene Association. Nov. 13 to 15. Annual meeting, Congress Hotel, Chicago. A. Cressy Morrison, 30 East Forty-second Street, New York, secretary.

American Institute of Steel Construction. Nov. 13 to 16. Annual meeting, Edgewater Gulf Hotel, Biloxi, Miss. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

Foundry Equipment Manufacturers' Association. Nov. 19. Forty-eighth annual meeting, Hotel Van Curler, Schenectady, N. Y. H. W. Standart, Northern Engineering Works, Detroit, president.

National Founders' Association. Nov. 20 and 21. Annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

DECEMBER

American Society of Mechanical Engineers. Dec. 2 to 6. Annual meeting, 29 West Thirty-ninth Street, New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 2 to 7. Annual exposition, Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, manager.

PERSONAL

T. M. GIRDLER, who recently resigned from the presidency of the Jones & Laughlin Steel Corporation, has been elected a member of the advisory committee of Continental Shares, Inc., a steel stock holding company controlled by Otis & Co., Cleveland investment bankers.

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H. B. SCOTT, manager of the tin plate sales division of the Wheeling Steel Corporation, Wheeling, W. Va., and N. C. REED, manager of the company's Detroit office, have been appointed assistant general managers of sales with headquarters at Wheeling. Here their work will be under the supervision of W. B. HIGGINS, vice-president in charge of sales, and J. L. NEUDOERFER, general manager of sales. W. M. HALL, now manager of the company's Boston office, has been transferred to Wheeling to succeed Mr. Scott as manager of tin plate sales. S. H. WATERS, now in the Boston office, will succeed Mr. Hall there as acting manager. H. B. MILLER, now in charge of the company's Cincinnati office, will succeed Mr. Reed at Detroit. Mr. Miller was in the Detroit office before going to Cincinnati, and he will be replaced at the latter city by H. E. SMITH, who is now manager of the St. Louis office. B. M. SHARPE, assistant manager at St. Louis, succeeds Mr. Smith. O. I. STRICKLAND, recently an assistant manager in the tubular sales division at Wheeling, has been appointed manager of that division.

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HENRY M. KELLY, assistant general manager of the Youngstown district for the United Engineering & Foundry Co., Pittsburgh, has retired after almost 43 years of continuous service with the company. He entered the employ of Lloyd Booth & Co., Youngstown, when he was 19 years of age and continued with that organization after its acquisition by the United company. He has been succeeded by E. E. CROSS, who has been associated with the Carnegie Steel Co. ROBERT MCGHIE, foreman at the company's Youngstown plant, has also resigned.

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BENNETT CHAPPLE, director of publicity, American Rolling Mill Co., Middletown, Ohio, addressed the ninth annual Cleveland Foreign Trade Conference, Nov. 1, on advertising to increase foreign sales. The meeting was held under the auspices of the Foreign Trade Committee of the Cleveland Chamber of Commerce.

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PERCY W. LEE, Arthur Lee & Sons, Ltd., the Crown Steel & Wire Mills, Sheffield, England, has returned to England after a three weeks' visit to strip mills in the United States.

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DR. P. J. GIANI, metallurgical engineer, Fried. Krupp, A. G., Essen, Germany, sailed from New York, Nov. 2, for Germany, following an extended sojourn in the United States, studying processes and markets largely in tool steels and forgings.

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WALTER MICKELSON, factory manager of the Kempsmith Mfg. Co., Milwaukee, has been made manager of the Cleveland branch office, and is succeeded by H. L. LIVESEY, production manager. GERALD G. TOLLIGER, formerly superintendent of the Evinrude Motor Co.'s Milwaukee plant, has been made production manager.

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GEORGE L. HISE, of the Central Tube Co., Ambridge, Pa., has been appointed superintendent of pipe mills of the Republic Iron & Steel Co. He succeeds JOHN BAXTER, who had been with the Republic company for 20 years and largely supervised construction of new pipe capacity installed since the World War.

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WILLIAM L. WOODWARD has been elected vice-president of the Superior Steel Corporation, Pittsburgh. For several years he has been assistant to the president of the Eaton Axle & Spring Co., Cleveland, and previously was general manager of the Standard Welding Co., Cleveland. He was graduated from Massachusetts Institute of Technology in 1907.

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S. S. BUCKLEY, formerly president of the Onondaga Steel Co., Syracuse, N. Y., has become associated with Ekstrand & Tholand, 1 East Forty-second Street, New York, to promote the sale of Swedish sponge iron.

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J. J. MITCHELL, heretofore Cleveland sales manager of the Square D Co., Detroit, has been placed in charge of all of the company's panelboard sales, with headquarters in Detroit. M. W. PARMALEE succeeds him in Cleveland.

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H. M. DAVISON, who has been manager of excavator sales of the Harnischfeger Sales Corporation in the Eastern territory, with headquarters in New York, has been made general sales manager of the company, with offices at Milwaukee.

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W. C. HECKEROTH, for the past two years with the Fuel Efficiency Engineering Corporation, Birmingham, has been appointed Birmingham district sales agent of the Erie Iron Works, Erie, Pa.

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ALBERT J. SAMS, of Chicago, has been appointed railroad sales representative for the Little Giant Co., Mankato, Minn., manufacturer of power hammers.

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GEORGE H. FREERS, who has been assistant chief engineer of the Marmon Motor Car Co., Indianapolis, for the past five years, has been made chief engineer, succeeding THOMAS J. LITTE, JR., who has resigned.

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D. O. REARDON has been appointed representative in Iowa, with headquarters in Des Moines, for the Wagner Electric Corporation, St. Louis.

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BERNARD NAGELVOORT, formerly plant manager of the Murray Corporation of America, has joined the Rotor Air Tool Co., Cleveland, as sales engineer, with headquarters in Detroit.

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SAMUEL L. HOYT, research laboratories of the General Electric Co., Schenectady, N. Y., was the guest of the Boston branch of the National Metal Trades Association on Nov. 6 at the Hotel Essex, Boston. He discussed carboloy, dealing with its physical properties, hardness, and uses.

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ARTHUR J. SPEER, for 15 years industrial secretary of the National Council of the Young Men's Christian Association, has been made personnel director of the American Cast Iron Pipe Co., Birmingham.

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W. C. SUTHERLAND, assistant to the president of the Pittsburgh Steel Co., Pittsburgh, has been elected a director. Before promotion to his present position last July, Mr. Sutherland was general superintendent of the company.

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CHARLES M. SCHWAB, chairman of the board of the Bethlehem Steel Corporation, will deliver the principal address at the annual dinner of the Illinois Manufacturers Association, Dec. 10, at the Stevens Hotel, Chicago.

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ALEXANDER CAMERON, assistant to F. H. GORDON, vice-president, Lukens Steel Co., Coatesville, Pa., has been placed in charge of the Philadelphia and New York offices of the company. F. L. SHANTS is assistant manager of sales in the Philadelphia office and HARRY LOEB continues in charge of the New York office. Mr. Cameron will make his headquarters in Philadelphia, but divide his time between the two offices. He joined the Lukens Steel Co. about three years ago, leaving the Michigan Steel Co. to become assistant to Mr. Gordon, who was at that time general manager of sales.

The eighth National Exposition of Power and Mechanical Engineering, known as the National Power Show, will be held in Grand Central Palace, New York, during the week of Dec. 2. The 420-odd booths already subscribed for will occupy approximately 130,000 sq. ft. of surface on three floors. Charles F. Roth and Fred W. Payne, Grand Central Palace, New York, are in charge.

OBITUARY

WILLIAM LISTON BROWN, formerly president of Pickands, Brown & Co., Chicago, died at his home in Pasadena, Cal., on Nov. 1, aged 87 years. He was born in St. Joseph, Mich. At the close of the Civil War, in which he served, he entered the pig iron and coal business as a clerk with A. B. Meeker & Co. and was made a partner

W. L. BROWN

in 1870. In 1883, he helped organize Pickands, Brown & Co. and seven years later, with others, formed the Chicago Shipbuilding Co., which was later merged with the American Shipbuilding Co. He was president of the latter until 1908. At one time he was chairman of the finance and executive committees of the Illinois Steel Co. He had also been president of the Federal Furnace Co. and director of the Lackawanna Steel Co. He retired from business about 10 years ago.

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FRANK SALOMON, report of whose death in Munich has reached this country, was for years interested in the sale of American machine tools. Early in his career he was identified for 12 years with the Brown & Sharpe Mfg. Co. and then went to Europe as sales engineer for the Schuchardt & Schutte Co. and later with Alfred H. Schutte in Cologne. Subsequently he became president of the Otto Gas Engine Co., Philadelphia, but returned to Germany in 1914.

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FRANK M. HAMILTON, president Thomas Hamilton's Son Co., Philadelphia, died on Oct. 12.

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ROBERT EMMET JENNINGS, formerly a vice-president of the Crucible Steel Co., died at his home in Montclair, N. J., on Oct. 30, aged 84 years. As a young man he entered the steel business with Atha & Illingsworth, Newark, N. J., and after a few years left to establish Spaulding & Jennings, Jersey City, N. J. This company was purchased by the Crucible Steel Co. in 1900, of which he was vice-president until 1904. He was later appointed receiver of the Carpenter Steel Co., Reading, Pa., and after the reorganization he was elected president. In 1917 he was made chairman of the board, and retired a few years later.

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ALEXANDER L. SCHUHL, manager of the Philadelphia office of the Independent Pneumatic Tool Co., Chicago, died of pneumonia on Oct. 20, aged 45 years.

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JOHN WILLIAM LIEB, vice-president of the New York Edison Co. and a pioneer in the electrical field in this country, died at his home in New Rochelle, N. Y., Nov. 1, aged 69 years. He was born in Newark, N. J., and after his graduation from the Stevens Institute of Technology in 1880, he became identified with the Edison Electric Light Co., and assisted in making plans for the dynamos and equipment of the first central station for the distribution of electricity in New York. The following year he was sent to Milan in connection with the installation of electric light and power service in Italy, and while he was in Italy, Mr. Lieb began his study of Leonardo da Vinci, that made him a da Vinci authority.

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HARRY I. ILLINGSWORTH, president, Boston Machine Works, Lynn, Mass., died on Oct. 31 at his home in that city, aged 63 years.

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PETER A. NEWTON, general superintendent at the South works of the Illinois Steel Co., died suddenly soon after he entered his office on Nov. 4, aged 56 years. On his graduation from Cornell University in 1894 in mechanical engineering, he entered the service of the Illinois Steel Co. at the Joliet works, where he was steam engineer and assistant master mechanic until 1899. Then he was made assistant superintendent of the billet and rod mills and in 1901 was appointed assistant general superintendent of Joliet works. He was transferred to the South works in 1906 as assistant general superintendent and the following year was made general superintendent.

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THERON I. CRANE died at his home in Philadelphia Nov. 2, aged 68 years. He was born in Indianapolis, but for most of his business career, or from 1880 to 1916, was identified with the pig iron trade of the East as a partner in Pilling & Crane, Philadelphia. In 1902, in association with W. S. PILLING, he organized the Northern Iron Co., which operated Northern furnace at Port Henry, N. Y., and later operated under lease the Standish furnace of the Delaware & Hudson Co. at Standish, N. Y. In 1906 Mr. Crane and others organized the Northern Ore Co., which for a time operated Keystone furnace at Island Park, Easton, Pa., formerly owned by the Thomas Iron Co. He was for a number of years a director of the Eastern Steel Co., Pottsville, Pa., and a director of the Bank of North America, Philadelphia.

Reinforcing Steel

Awards Total 9300 Tons and Inquiries 2700 Tons

REINFORCING steel lettings, at 9300 tons, include 1700 tons for barracks at San Antonio, Tex., 1300 tons for a rubber manufacturng plant at Passaic, N. J., and 1200 tons for an addition to a paper mill at Camas, Wash. Fresh inquiries amounted to 2700 tons. Awards follow:

HEMPSTEAD, N. Y., 250 tons, telephone building, to Carroll & McCreary.

NEW YORK, 125 tons, telephone building on Fiftieth Street, to Carroll & McCreary.

NEW YORK, 500 tons, board walk at Rockaway Beach, to Carroll & McCreary.

PASSAIC, N. J., 1300 tons, United States Rubber Co. building, to Jones & Laughlin Steel Corporation.

SPRINGFIELD, ILL., 1000 tons, State institutional buildings, to Inland Steel Co.

PITTSBURGH, 900 tons, McCann building, to Carlem Engineering Co.

SAN ANTONIO, TEX., 1700 tons, barracks at Randolph Field, to Laclede Steel Co.

CAMAS, WASH., 1200 tons, addition to Crown Willamette Paper Co. plant, to Pacific Coast Steel Co.

ST. HELENS, ORE., 300 tons, plant, Fir-Tex Insulating Board Co., to Truscon Steel Co.

PORTLAND, ORE., 200 tons, Nurses' Home, to Truscon Steel Co.

PORTLAND, 100 tons, addition Jantzen Knitting Mills, to Soule Steel Co.

SAN FRANCISCO, 1000 tons, warehouse for Pacific Gas & Electric Co., to Pacific Coast Steel Co.

SAN FRANCISCO, 550 tons, Pier No. 1, to Pacific Coast Steel Co.

STOCKTON, CAL., 150 tons, theater, to Truscon Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 300 tons, Crawford Street bridge.

BROOKLYN, 300 tons, *New York Times* building.

ELMIRA, N. Y., 155 tons, new school.

PHILADELPHIA, 400 tons, Convention Hall; bids in.

ROCKFORD, ILL., 225 tons, factory for Mechanics Universal Joint Co.

SPRINGFIELD, ILL., 475 tons, State buildings; J. B. French & Co., general contractors.

CHICAGO, 500 tons, Henrotan Hospital.

YOUNTVILLE, CAL., 400 tons, Veterans' Home; bids Nov. 19.

SACRAMENTO, CAL., 147 tons, bridge over San Gabriel River; bids opened.

Recovery in Continental Steel Markets

Higher Prices Follow Reduction in Cartel Quotas—British Prices Firm Under Advancing Costs

(*By Cable*)

LONDON, ENGLAND, Nov. 4.

UNCERTAINTIES as to the Government's coal scheme have somewhat adversely affected the iron and steel business, but the decline in the bank rate has left consumers rather less anxious. Good pig iron inquiries are again circulating. Cleveland makers have sold moderately for November and their stocks are small, and being faced with a further increase in fuel costs, are holding prices firmly. Producers of hematite iron have already raised quotations 1s. following substantial sales for early next year.

Steel makers are meeting this week to discuss the 1930 program. It is regarded possible that official prices will be raised because of advanced costs, although opposition is strong in many quarters.

Business is generally quiet but good inquiries are looked for. Structural and metal-working plants are well occupied especially on domestic orders. Shipbuilders are slow to release tonnages to the mills, but new ship building is reported to be improving, so that the outlook in this direction seems healthy.

The International Raw Steel Cartel has proposed an immediate reduction of 10 per cent in output with the result that Continental makers are adopting a stiffer attitude and prices appear to have turned the corner. Business with Europe is dull except in semi-finished steel, but considerable quantities are arriving under old contracts.

Tin plates are steady in spite of weakness in tin. Makers are well supplied with orders so that there is no need to press for sales.

Consumers are in need of plates and good inquiries are expected, particularly as world consumption appears to be steadily increasing; certain it is that requirements of important users are now larger.

Demand for galvanized sheets has improved slightly and makers are less keen to accept lowest prices. Black sheets are quiet.

Clyde shipbuilding output in October was 20 vessels of 57,500 tons.

Nasmyth, Wilson & Co., Ltd., Manchester, has secured an order for six locomotives for the Kenya Uganda Railroad.

Quota Reductions Bring Higher Prices in Europe

(*By Radiogram*)

BERLIN, GERMANY, Nov. 4.

THE decree of the International Steel Cartel reducing production quotas of the member countries by 10 per cent has led to considerable recovery in the international market, with a sharp rise in prices.

Immediately before the decree, prices were the lowest since 1927. In the last few days prices of nearly all forms of steel, in particular bars, structural shapes and sheets, have advanced 1s. to 4s. a ton. Demand has increased and producers entirely dominate the market. Düsseldorf experts predict a further recovery and rise in prices. Domestic prices for November remain unchanged.

Steel Cartel Suggests Reduced Production

(*By Cable*)

PARIS, FRANCE, Nov. 1.

The executive committee of the International Steel Cartel, which is meeting here, has recommended that rolling schedules be reduced 10 per cent, effective Nov. 1, based on the present low prices and lack of buying in the steel markets.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	17½	to	3	18	18.79	to	18.91
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17¼	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	17½	to	13	5	2.78	to	2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	8	to	3	10	16.49	to	16.97
Billets, Thomas	4	12½	to	4	13	22.43	to	22.56
Sheet bars, Thomas	4	12	to	4	12½	22.31	to	22.43
Wire rods low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Black sheets, No. 31 gage, Japanese	12	6	to	12	7½	59.65	to	60.02
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	4	to	5	5	1.13	to	1.14
Steel bars, deformed	5	3	to	5	4	1.12	to	1.13
Beams, Thomas, British standard	4	18	to	5	4	1.06	to	1.13
Channels, Thomas, American sections	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	0	to	5	7	1.08	to	1.16
Angles, Thomas, 3-in.	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Hoop and strip steel over 6-in. base	5	7½	to	5	10	1.15	to	1.19
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	16				1.89		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	10				2.49		
Wire nails, base	7	10	to	7	10½	$1.62	to	$1.63 per keg
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

British Mills Need Tonnage

Steel Export Curtailed by Low Continental Prices—Some European Pig Iron Sold to British Users

LONDON, ENGLAND, Oct. 25.—Most steel mills are not particularly well situated with orders for the approach of the winter months. While blast furnaces are better engaged, many have but little business on their books for delivery beyond October. A desirable feature is that output is going directly into consumption and there is but little surplus iron for the open market.

Lack of business on the Continent has developed pressure by European mills for export tonnage, so that there has been some increase in foreign competition. Import of pig iron by British consumers, however, is not as a rule profitable, because of inland freight rates. In certain instances, however, basic iron has been sold to mills in Wales, and some French hematite is being shipped into the North of England, at the same time, it is difficult to sell Cleveland iron abroad at present prices, so that furnaces have been forced to rely on their domestic customers.

In semi-finished steel a certain proportion of business, particularly where a high grade steel is required, has been coming to British mills, but the renewal of severe Continental competition for billet and sheet-bar business has made it difficult for British works to secure even a fair share of this tonnage. Some good orders for foreign sheet bars have been placed by Welsh mills. British mills are unable to understand why the Continental makers should offer the drastic concessions in price that have been prevalent in the past few weeks. Sheet bars, for example, have declined about 7s. ($1.70) a ton in a month, and it is suggested that this may be the result of an effort to secure larger quotas in the International Steel Cartel.

Demand for finished material is light. Prior to the latest meeting of the Steel Makers' Association, considerable business was placed, particularly by the shipyards, in expectation of a rise in prices based on increased raw material costs. Specifications against these contracts are now being received and in a number of cases the steel mills are well occupied. Shipyards, however, are not receiving any large shipbuilding contracts, so that as these orders are completed there is but little to replace them. Various construction and electrical projects require a considerable tonnage of steel, but export trade is still restricted.

British consumers have the benefit of the steel makers' rebate plan, but on the Continent competition is difficult to meet. The tin plate trade is an exception, and a good tonnage has been shipped recently. World consumption of tin plate is increasing, but in the past few days, buyers have been deterred by the decline in the tin market. Most mills, however, are heavily engaged for some months.

According to *Lloyds Register*, vessels under construction in the United Kingdom at the end of September had decreased by about 5500 tons compared with June, although the total was more than 300,000 tons greater than in September, 1928. The total tonnage under construction was 1,448,000 tons. Abroad, 1,369,000 tons of shipping is being constructed, which is 15,000 tons less than in June. Tonnage laid down in the United Kingdom in the third quarter was 360,000 tons, a decrease of 68,000 tons and launchings totaled 370,000 tons. Abroad 300,000 tons of shipping was begun and 346,000 tons launched in the third quarter. A large part of the new contracting since the end of the third quarter has been in oil tank ships for Norway.

German Shipyards Seeking Tonnage

HAMBURG, GERMANY, Oct. 21.—At the end of September, German shipyards had a total of only 235,499 gross tons of shipping contracts compared with 406,982 tons in the first quarter of this year. New contracts have been limited and the shipyards are buying but little steel from the mills, so that plate and shape business is quieter.

Japanese Black Sheet Market Declines

Germany has developed into a close second to Great Britain in furnishing light gage black sheets to Japan, according to A. Cameron & Co., Kobe, Japan, in a report on Japanese market conditions for September. Of a total of 6420 tons of black sheets, arriving at Japanese ports of Kobe, Osaka and Yokohama in August, Great Britain furnished 2467 tons, Germony 2279 tons, the United States 1664 tons and Sweden 10 tons.

While there was some improvement in the Japanese black sheet market in September, a marked increase in the supply of sheets by the Kawasaki Dockyard Co. and other Japanese mills leaves rather large stocks on hand. Defective sheets, seconds and waste, offered by Japanese mills are promptly taken by consumers because of attractive prices, and there is an apparent increase in demand for sheet seconds from Japanese mills, buyers exhibiting less interest in defective sheets from abroad.

Recovery of the rate of exchange in the second half of September and reports that British sheets were being offered at £13 18s. 6d. ($67.80) per ton caused the market to sag toward the end of the month. A conference of the Kawasaki Dockyard Co. and accredited dealers in sheets has fixed the black sheet price for December delivery at 173 yen, based on £13 18s. ($67.68) per ton, a decline of 3 yen ($1.45) per ton. It is noteworthy that American black sheets are selling at about 1 sen (0.48c.) per sheet less than British. At the end of September British sheets were quoted at 65 sen (31.32c.) and American at 64 sen (30.84c.) per sheet.

Manganese Ore Prices Decline in Germany

HAMBURG, GERMANY, Oct. 21.—Manganese ore prices have registered a further decline and in the past week ore has been sold at 11¼d. (22½c.) per unit, c.i.f. German port. The lower grade Russian manganese ore from the Nikopol deposits in the Ukraine, which averages about 46 per cent manganese, has been sold at 10½d. (21c.) per unit, c.i.f. port.

Recently the South African manganese ore mines, controlled by the Manganese Ore Corporation, Ltd., at Postmasburg, have closed contracts for shipment of about 200 tons to France and more than 20,000 tons of ore to Germany, Belgium and Czechoslovakia. These sales are understood to have been on the basis of furnishing ore with 52 per cent Mn. and 0.15 per cent max. Phos.

Italy Inquires for Furnaces and Rolling Mills

HAMBURG, GERMANY, Oct. 21.—Recent Italian inquiries for steel mill equipment are sufficient to increase the output of the country by close to 200,000 tons a year. Inquiries include two blast furnaces, a number of open-hearth furnaces and considerable rolling mill equipment. German engineering companies bidding on this business expect orders to be placed soon.

EXPORTS OF AMERICAN ROCK DRILLS*

Destination	1925	1926	1927	1928
Union of South Africa	$184,979	$239,778	$310,937	$356,607
Canada	128,270	136,606	172,710	244,172
Spain	137,519	70,091	198,544	188,272
United Kingdom	97,628	160,399	216,263	180,320
Mexico	207,426	182,378	190,906	165,716
France	61,329	62,792	91,588	123,730
Australia	103,785	105,377	103,102	86,303
Japan	105,836	141,406	87,420	72,346
Chile	89,044	64,817	50,709	69,972
Total, including others	$1,373,702	$1,505,833	$1,885,175	$2,023,293

*From report prepared by Industrial Machinery Division, Department of Commerce.

Germany's Exports Gain 50 Per Cent in Three Years

Recording an increase of almost a billion dollars in the export trade of 1928 over that of 1927, at current money values, the fourth annual accounting of international trade, issued by the National Foreign Trade Council, shows a steady growth of the world's exports and a rate of annual increase slightly greater than that prevailing before the war. The advance in the world's foreign trade since 1925 is fully 15 per cent, or an average annual increase of 5 per cent. Between 1900 and 1913 the aggregate growth of the world's exports was about 63 per cent, or slightly less than 5 per cent a year.

The latest figures for 91 nations whose trade represents 95 per cent of current international commerce, place the world's 1928 exports at $32,914,000,000, equivalent to $23,567,000,000 at the 1913 value of the dollar. This compares with 1913 exports for these same nations of $20,055,000,000. They reached their pre-war level again for the first time in 1925 with exports of $20,454,000,000, increased to $21,025,000,000 in 1926 and to $22,867,000,000 in 1927. All the council's figures have been adjusted to the 1913 value of the dollar in order to provide a comparison free from factors of inflation.

The restoration of the world to its pre-war rate of progress in export growth is largely due to the export trade development since 1925 of three nations—Germany, the United States and Canada. Within the past three years Germany has outstripped all other nations in the advance of her exports. In 1925, they were valued at $1,414,000,000, reckoned at the 1913 valuation of the dollar. In 1928, they reached $2,093,000,000, a gain of $679,000,000, or almost 50 per cent. The increase of the United States in the past three years has also been notable, mounting from $3,147,000,000 in 1925, at the rate of the 1913 dollar, to $3,663,000,000 in 1928, a gain of $516,000,000, or about 17 per cent. Canada has increased her exports in this period by $162,000,000, from $819,000,000 to $981,000,000, or about 18 per cent.

The three nations whose total advances since 1913 are the greatest in amount are the same as were recorded last year—the United States, Canada and Japan. American exports increased between 1913 and 1928 by $1,179,000,000, or 48 per cent, at the 1913 valuation of the dollar; Canada's increased by $520,000,000, or 113 per cent, and Japan's by $341,000,000, or 109 per cent. Although our quantity gain was twice that of Canada and three times that of Japan, their advance at more than twice our own rate of growth is a fact that should not escape attention.

The most significant general increase in export trade during the year was that of the 12 nations of western Europe. The aggregate export of these nations for 1928 was $9,670,000,000. This was 98½ per cent of the export trade they carried on in 1913, using the strictly realistic comparison of the 1913 value of the dollar. Germany's rapid progress has brought her up to within 87 per cent of her 1913 real exports, Great Britain up to 95 per cent and Belgium up to 86 per cent. All the other nations of western Europe are doing more export trade than they did before the war with the exception of Holland, whose change of method in computing statistics makes exact comparison impossible.

Wabana Ore Shipments to Reach 1,800,000 Tons

WASHINGTON, Oct. 31.—Shipments of iron ore from mines in Newfoundland amounted to 1,001,849 gross tons during the current year up to Sept. 23, according to Consul A. M. Warren, St. John's. Germany was the largest purchaser of Bell Island ore, taking 483,669 tons, while 468,910 tons was shipped to Sydney, Nova Scotia, 43,940 tons to the United States and 5330 tons to Scotland.

It is estimated that before the end of the shipping season, which terminates on Dec. 20, unless Conceptior Bay is frozen before that time, 1,800,000 tons of ore will have been shipped if the current rate of production is maintained.

The British Empire Steel Corporation, which operates the Bell Island mines, has agreed to pay an export tax on ore sold abroad amounting to 10c. a ton, up to an annual total of 1,500,000 tons. Shipments in excess of this quantity are tax-free.

Accident Prevention Contest Conducted at Springfield

The Gilbert & Barker Mfg. Co., P. P. Kellogg Co., Van Norman Machine Tool Co., New England Box Co., Standard Electric Time Co. and Bay State Elevator Co. were winners of banners for September in the Springfield, Mass., industrial accident prevention contest. Sixty-seven firms are enrolled in this contest. In September 65 firms, employing 26,155 people, operated 4,846,796 hr. with an accident frequency of 18.98 per million hours worked and a severity rate of 0.40 per thousand hours worked. Figured at the rate of $4 per day, the employees of these plants suffered a loss of $7,848. In September there was a decrease of 15 in the number of lost time accidents, as compared with August, with a larger reduction in the number of days lost.

Bethlehem Expansion at Johnstown

The Bethlehem Steel Co. has announced a further expansion program calling for an expenditure of $10,000,000 at its Cambria works, Johnstown, Pa., according to an announcement by Eugene G. Grace, president of the company, while on an inspection tour of the Cambria plant. The improvements will be undertaken as soon as the present $12,000,000 betterment program at the plant is completed, and will center in the lower works departments. The program will include the installation of a new Bessemer department and new open-hearth furnaces.

Practical Use of X-Ray in Industry

An attractive booklet of 24 pages has recently been issued by the Kelley-Koett Mfg. Co., Inc., Covington, Ky., entitled "The Practical Use of the X-Ray in Industry." This company has had considerable experience in the examination of various metals and other materials with the X-ray, and the booklet gives some illustrations of the results and discusses the application of the X-ray to industry in general. The company also furnishes equipment for such work.

Desch Supply & Equipment Co., Baltimore, has been appointed sales representative in the State of Maryland and Washington, D. C., for Grefco chrome high-temperature cement and standard silica bonding cement made by the General Refractories Co., Philadelphia.

Production, Orders and Sales—Steel Castings and Power Equipment

	September, 1929	August, 1929	September, 1928
Commercial Steel Castings (a):—			
Production, total, net tons	101,800	120,800	75,761
Production, nine months	1,011,282	.....	769,416
Production, railroad items	42,500	51,400	25,311
Production, miscellaneous	59,300	69,400	50,450
New orders, total, net tons	83,200	100,500	82,762
New orders, nine months	1,010,077	.....	740,308
New orders, railroad items	32,450	36,500	35,234
New orders, miscellaneous	50,750	64,000	47,528
Mechanical stokers sold, hp. (a)	44,485	54,929	65,060
Mechanical stokers, nine months	457,832	.....	401,319
Steel boilers ordered, No. (a)	1,909	1,859	1,425
Steel boilers heating surface, sq. ft.	1,958,307	1,781,489	1,257,000
Steel boilers heating surface, nine months	15,558,597	.....	13,417,132

(a) United States Department of Commerce.

Welded Steel Fabric Made Available for Wider Use

Truscon welded steel fabric, which has been used to reinforce concrete highways for several years, has recently been made available in sizes and weights suitable for general reinforcing work.

The fabric comes with 4-in. mesh, the main wires and cross wires being welded by an electrical process that results in positive fusion of the two wires. The fabric is shipped in coils or sheets in weights up to 97 lb. per 100 sq. ft. It is expected that the new product will be used in the construction of docks, bridges, levees, floor slabs, reservoirs, driveways, sewers, subways, stadiums, viaducts, flues, grandstands, pipe, sidewalks and sea-walls.

A pamphlet put out by the Truscon Steel Co., Youngstown, Ohio, contains a general description of the product, with tables of standard types and sizes, properties of the wire used and sectionel areas of the fabric, allowable load capacities for floor slabs of various spans, a tentative schedule of specifications for reinforced concrete sewer pipe and tables for estimating weight per 100 sq. ft. of welded steel fabric.

American Papers at Testing Congress in Zurich

Statements concerning developments which have taken place in specific fields in each country are planned by the permanent committee for the International Congress for Testing Materials to be held in Zurich in 1931. From these a number of subjects for discussion at the congress will probably be selected. The statements for the United States have been secured by W. H. Fulweiler, the representative of the American Society for Testing Materials on the permanent committee, through the cooperation of a number of so-called "reporters," each one an authority in the particular field covered. The complete list of statements, up to the present time, is as follows:

Cast Iron: "Alloy Cast Iron and High Strength Cast Iron in the United States of America," by F. B. Coyle, International Nickel Co., Inc., New York; *Materials at High Temperatures:* "Alloys of Iron, Nickel and Chromium," by Marcus A. Grossman, Central Alloy Steel Corporation, Massillon, Ohio; *Welding:* "Compression of Welded and Riveted Joints," by F. P. McKibben, consulting engineer, General Electric Co., Black Gap, Pa.; *Progress in Metallography:* "Thermal Analysis and Dilatometry," by Howard Scott, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; "*Non-Metallic Inclusions in Metals*," by G. F. Comstock, Niagara Falls, N. Y.; "*Advances in Microscopy*," by F. F. Lucas, Bell Telephone Laboratories, Inc., New York.

Ryerson Buys Camden, N. J., Steel Jobbing Company

Joseph T. Ryerson & Son, Inc., has purchased, effective Nov. 16, the business, equipment and stock of the Penn-Jersey Steel Co., Camden, N. J. The Penn-Jersey company warehouses in the Philadelphia district a complete stock of steel shapes, plates, sheets, hot and cold finished bars and reinforcing bars. Ryerson & Son plans to enlarge the stock at Camden, and to increase facilities of distribution.

Stock Offer Withdrawn

The Sharon Steel Hoop Co., Sharon, Pa., which recently offered its stockholders rights to subscribe for 90,000 shares of no par common stock of the company, has withdrawn that offer on account of recent developments in the security market. It is stated that the offer may be renewed when and if the directors feel that such action is for the best interest of the company and the stockholders, and when the general situation is more stabilized.

Fabricated Steel Plate, Furniture and Boilers

		September, 1929	August, 1929	September, 1928
Fabricated steel plate orders, net tons(a)		40,432	39,702	40,281
do.,	nine months	412,716	.....	383,968
do.,	oil storage tanks	14,991	11,150	18,572
do.,	refinery materials	4,009	5,059(b)	5,021
do.,	tank cars	2,779(b)	720	684
do.,	gas holders	3,353	3,317(c)	1,642
do.,	blast furnaces	200	115(d)	386
do.,	stacks and miscellaneous	15,100(e)	19,341	13,976
Steel barrel production, number(a)		668,224	806,574(f)	593,255
do.,	nine months	6,515,997(g)	.....	5,627,004
do.,	shipments	658,583	809,860(f)	595,640
Steel furniture orders(a)		$2,278,575(h)	$2,417,725	$2,689,009
do.,	nine months	25,309,396	.....	26,494,881(g)
do.,	shipments	2,322,535(h)	2,482,594	2,754,135
do.,	unfilled orders(j)	2,067,742(h)	2,171,493	2,061,856
Steel shelving orders(a)		732,020(h)	931,468	799,850
do.,	nine months	8,942,474(g)	.....	6,938,397

(a) United States Department of Commerce.
(b) Largest since last March.
(c) Smallest since last April.
(d) Smallest since last February.
(e) Smallest since last January.
(f) Second largest ever made, exceeded only by last May.
(g) Largest ever reached.
(h) Lowest so far this year.
(j) End of month.

New Company Makes Gas-Fired Industrial Boilers

The Steam & Combustion Co., 205 West Wacker Drive, Chicago, has been incorporated for the production and sale of gas-fired boilers for industrial processing lines and kindred products. The company is owned and operated by the G. W. Dulany Trust, Chicago. G. W. Dulany, Jr., is chairman of the board; C. B. Page, president; William E. Eberhart, vice-president and treasurer, and James E. Moore, secretary and assistant treasurer.

The gas-fired boilers now being placed on the market are produced in association with the Freeman Mfg. Co., Racine, Wis., and the National Machine Works, Chicago. The former manufactures boilers and the latter specializes in gas combustion equipment. L. A. McDowell, a director of the new company, is president of the Freeman Mfg. Co., and W. R. Zitzowitz, also director, is president of the National Machine Works. Installations of the company's product have already been made in Chicago and plans are under way for introducing the line in other territories.

Electrical Equipment for Special Beam Mill Let

Electrical equipment for the main drive of a beam mill, to be installed at South works, Illinois Steel Co., Chicago, has been let to the Westinghouse Electric & Mfg. Co., East Pittsburgh. The mill will be used to produce a wide-flange section, which differs from the standard I-beam in that the flanges are of uniform thickness instead of being tapered, and the thickness of the metal in the flanges can be varied over a wide range. Due to its special features this section has come into heavy demand in building construction.

Special study has been given to this mill and several modifications have been made in the mill and electrical designs. An example of this is the two-motor, direct drive, for the blooming mill, which was described in THE IRON AGE of Oct. 31, page 1178.

Pittsburgh & West Virginia to Build Branch Line

The Pittsburgh & West Virginia Railway Co. has applied to the Interstate Commerce Commission for permission to construct a 6-mile branch line to connect Monessen and Donora, Pa., with the new Connellsville extension of that road now under construction.

The branch would connect the new extension at Charleroi, Pa., with the Donora Southern Railroad, a steel plant belt line. The Connellsville extension of the Pittsburgh & West Virginia extends from Cochran's Mills, Allegheny County, Pa., to Connellsville, where a connection is made with the Western Maryland and thence to tidewater at Baltimore.

Machinery Markets and News of the Works

October Tool Sales Large

Some Falling Off in Final Week—Effect of Stock Market Collapse Not Yet Gaged

MACHINE tool sales declined during the past week, although the totals for October are generally larger than those for the preceding month. To what extent the quieter business of the past week was caused by the widespread absorption in events in Wall Street cannot be estimated, but it is certain that routine business affairs in many quarters were neglected.

One of the largest machine tool distributers in the East reports that its October volume was the second largest for any month this year, and, when final footings are made, it may prove to have been the largest.

A falling off in machine tool demand during November and December would not be unusual in any circumstances, as such buying generally tapers off with the approach of the annual inventory season.

The automobile industry is not counted upon to supply its usual volume of machine tool orders for expansion and replacements, it being assumed that present equipment will suffice for a curtailed demand for passenger cars, at least until such time as the buying power of prospective car purchasers has become more definitely known.

Machine tool plants have large orders on their books, in many instances assuring present full production schedules through January and February. Deliveries on some tools extend into March. Since the experience of 1921, when wholesale cancellations of machine tool orders swamped the industry, sales of machine tools by virtually all factors in the industry have been non-cancellable, and such a clause appears in sales contracts.

The machine tool industry expects that the stock market collapse will be followed by a period of hesitation and watchful waiting, but it looks to the liquid and prosperous condition of industrial buyers as a bulwark for a continuing satisfactory volume of business.

New York

NEW YORK, Nov. 4.—Notwithstanding the fact that the attention of many people was riveted last week on the stock market, to the exclusion of routine business affairs, the volume of machine tool buying was fairly good. Some local sales offices report a falling off in the number of inquiries, and a few office experienced a somewhat quieter week in sales, but no special significance is attached at this time to this development. One of the largest machine tool distributers in the Eastern territory states that its October business will at least be the second largest for any month this year and, when final footings are made, it may take first place in total sales.

A noticeable feature of the current situation is widespread buying in New England. This comes from machinery companies catering to almost every line of industry. Even if machine buying should taper off during the remainder of the year, machine tool manufacturers would not feel the effects for some months, because nearly all leading tool builders are sold up through January, at least, and many have orders that will carry them through February and well into March. The only unfavorable development is that some orders for automobile parts have been temporarily held up.

F. L. Smith Machine Co., 633 West Forty-fourth Street, New York, has rejected bids recently received for extensions and improvements in five-story plant, to cost about $40,000, and will ask new bids soon. Russell G. Cory, 30 Church Street, is architect and engineer.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene gas, welding equipment, etc., has plans for a new branch plant at Casper, Wyo., to cost more than $75,000 with equipment. It is scheduled for completion early next year.

I. Kallich, 26 Court Street, Brooklyn, architect, has plans for a four-story automobile service, repair and garage building, to cost about $140,000 with equipment.

W. S. Barstow, Glendale, L. I., manufacturer of farm lighting equipment, heating apparatus, etc., has acquired plant of United Sash & Door Co., Glendale, on site 200 x 233 ft., and will improve for new plant.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, is contemplating early call for bids for one-story addition to assembling plant at Tarrytown, N. Y., to cost about $200,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer

Western Electric Co., 195 Broadway, New York, has purchased plants and business of Turner-Armour Corporation, Brooklyn and Queens, manufacturer of telephone booths and kindred telephone equipment. Properties consist of one-story plant, totaling 80,000 sq. ft. floor space at 6600 Metropolitan Avenue, Queens, and three-story factory at 1201 Flushing Avenue, Brooklyn, aggregating 60,000 sq. ft., used primarily for assembling operations, and will be operated in future as Queens Borough Works of Western Electric Co. New owner is said to be planning improvements and extensions.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, has plans for one-story ice-manufacturing plant, to cost about $100,000 with machinery. Henry J. Nurick, 44 Court Street, is architect.

Board of Education, Albany, N. Y., is considering installation of manual training equipment in new junior high school to cost more than $1,200,000, for which bids will soon be asked on general contract. A. L. Delehanty, 121 North Pearl Street, is architect.

Atlantic Basin Iron Works, Inc., 168 Van Brunt Street, Brooklyn, has engaged G. L. Slaight, 343 Columbia Street, architect, to prepare plans for rebuilding part of plant recently destroyed by fire; a new two-story shop will be built, to cost about $45,000 with equipment.

Sonatron Tube Co., 57-9 State Street, Newark, manufacturer of radio tubes and equipment, is having revised plans drawn for new six-story addition, 70 x 120 ft., to cost over $100,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

Traveling ovens, power equipment, conveying machinery and other mechanical equipment will be installed in new four-story and basement plant, 170 x 200 ft., to be erected by National Biscuit Co., 85 Ninth Avenue, New York, at Newark, to cost $525,000 with equipment. General contract has been let to White Construction Co., 95 Madison Avenue, New York. Louis Wirsching, Jr., is company architect.

Juno Fasteners, Inc., 202 Penn Avenue, Hillside, N. J., manufacturer of radio tube parts and kindred equipment, has acquired former plant of J. M. Quimby Co., 24-34 Sterling Street, East Orange, N. J., for a new plant, and will remove to new location.

Eaton Kent Co., Academy Building, Newark, Coal-handling equipment and de-

vices, has leased one-story building at Harrison, N. J., for mechanical works, storage and distributing service.

New Jersey Art Foundry Co., 433 Tonnele Avenue, Jersey City, N. J., has awarded general contract to Frank Crahay, 3572 Hudson Boulevard, for one and two-story addition to foundry, to cost about $35,000 with equipment. Leo Feinen, 3697 Hudson Boulevard, is architect.

Spanjer Brothers, Inc., 198 Badger Avenue, Newark, manufacturer of signs and displays, is planning immediate rebuilding of part of plant destroyed by fire Oct. 29.

Francis P. Friedman, 395 Springfield Avenue, Newark, architect, is asking bids on general contract until Nov. 15 for a one-story automobile service, repair and garage building, 145 x 150 ft., at Passaic, N. J., to cost about $130,000 with equipment.

Oakley Valve & Foundry Co., 48 Ferguson Street, Newark, manufacturer of poppet valves for internal combustion engines, has been incorporated with capital stock of 5000 shares of no par value. Company's foundry work will consist chiefly of non-ferrous, nickel and monel metal castings. William E. Oakley is president.

McKiernan-Terry Drill Co., 15 Park Row, New York, has changed its name to McKiernan-Terry Corporation and has acquired ownership of National Hoisting Engine Co., Harrison, N. J., and Steele & Condict, Inc., Jersey City, N. J. Consolidation of these three companies whose products go into same fields has been effected to provide for business expansion. Work previously done at plant of Steele & Condict, Inc., will be divided between McKiernan-Terry plant at Dover, N. J., and National plant at Harrison. Arthur W. Buttenheim is president of McKiernan-Terry Corporation.

Buffalo

BUFFALO, Nov. 4.—International Business Machines Corporation, Endicott, N. Y., has plans for four-story addition, to cost more than $150,000 with equipment. C. H. Higgins, 101 Park Avenue, New York, is architect. Headquarters are at 50 Broad Street, New York.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has purchased oil storage and distributing plant and other properties of Empire State Oil Co., Binghamton, N. Y. Plans are under way for expansion in first noted unit, to cost about $100,000 with equipment.

Board of Education, Genesee Building, Buffalo, is considering installation of manual training equipment in new high school to cost over $1,350,000. D. G. McNeil, address noted, is architect for board.

American Locomotive Co., 30 Church Street, New York, has purchased plant and business of McIntosh & Seymour Corporation, Auburn, N. Y., manufacturer of Diesel engines. Plant will be continued under present name and operated as a subsidiary. Expansion is planned.

Irving Air Chute Co., 372 Pearl Street, Buffalo, has authorized immediate construction of new branch plant at Grand Central Air Terminal, Glendale, near Los Angeles, consisting of one-story unit for parts production and assembling, to cost about $100,000 including equipment.

The Crane Market

INQUIRY for overhead traveling cranes has decreased, but builders are well engaged on old orders and in most cases are quoting three to four months delivery. Following a delay caused by a threatened taxpayer's suit, contract of the Board of Transportation, New York, for six substations has been awarded to the General Electric Co., which has placed an order for six overhead cranes. The Standard Oil Co. of New Jersey, is asking prices on a small capacity hand power crane. Business in locomotive cranes is small in the East, but some fair orders have been placed in the Chicago district. Recent purchases have included: General Electric Co., Schenectady, N. Y., six 30-ton, 3-motor, overhead cranes for substations in New York for Board of Transportation, to Cleveland Crane & Engineering Co.; Sun Oil Co., Philadelphia, 15-ton crawl tread crane from unnamed builder.

New England

BOSTON, Nov. 4.—Platt Brothers & Co., Inc., Platts Mills, Waterbury, Conn., manufacturer of metals, metal stampings, aluminum products, etc., has plans for a one-story addition, 70x140 ft., to cost $40,000 with equipment. Fred A. Webster, Waterbury, is architect.

Buzzards Bay Gas Co., 1 State Street, Boston, is contemplating new artificial gas plant in Buzzards Bay district to cost about $550,000 with equipment. Cape Cod Gas Co., same address, an affiliated organization, has plans for a similar plant near Hyannis, to cost about $600,000 with machinery. S. B. Gallagher, 20 Hammatt Street, Ipswich, Mass., is engineer for projects.

Narragansett Electric Co., Providence, R. I., is arranging expansion over period of 36 months, in conjunction with similar program to be carried out by New England Power Association, Worcester, Mass., of which it is a subsidiary. Work will include extensions and betterments at South Street generating plant, extensions in underground conduit system and overhead lines, with installation of new equipment to cost $3,000,000; a new power substation will be built in East Providence district to cost $500,000, and number of smaller substations in different parts of city.

Scovill Mfg. Co., Waterbury, Conn., has awarded contract to Levering & Garrigues Co., 552 West Twenty-third Street, New York, for one-story addition to brass goods manufacturing plant, 62x391 ft., to cost more than $85,000 with equipment. Hugh L. Thompson, Waterbury, is architect.

William J. Hanna, Attleboro, Mass., manufacturer of cutlery, has started work on a one-story plant, 26x96 ft.

A. F. Robinson Boiler Works, Cambridge, Mass., has purchased local property, 100x200 ft., which will be developed for manufacturing purposes.

Providence Insulated Wire Co., Providence, R. I., is about to start work on a one and two-story, 24x100 ft., manufacturing plant and office addition.

H. E. Holbrook, Worcester, Mass., has started erection of a one-story foundry, to cost $12,000 without equipment.

Moore Drop Forge Co., Springfield, Mass., will build a one-story addition, 93x182 ft., to cost $35,000 without equipment.

Hemphill Co., Central Falls, R. I. manufacturer of hosiery machinery, has started work on a one-story addition, 60x200 ft.

Fairfield County Ice Co., Stamford, Conn., will build an ice manufacturing plant, 80x220 ft.

E. W. Carpenter Mfg. Co., Bridgeport, Conn., manufacturer of hardware supplies, has closed bids on a one-story addition, 52x132 ft.

United Electric Light Co., Springfield, Mass., contemplates erection of a one-story substation early next year.

Philadelphia

PHILADELPHIA, Nov. 4.—Plans have been filed by United States Gypsum Co., 1500 Walnut Street, Philadelphia, for two-story storage and distributing unit, to cost $80,000 with mechanical-handling and other equipment.

F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, is asking bids on general contract until Dec. 2 for new three- and four-story plant, to cost about $1,000,000 with equipment. A refrigerating and power plant will be installed. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Gimbel Brothers, Ninth and Market Streets, Philadelphia, have plans for a two-story automobile service, repair and garage building, 124 x 230 ft., to cost about $170,000 with equipment. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are architects and engineers.

Philadelphia Quartz Co., 121 South Third Street, Philadelphia, has acquired a 4-acre tract in Locust Point district, Baltimore, and is contemplating new plant on site to manufacture silicate of soda products, to cost more than $100,000.

Officials of Radio Corporation of America, Inc., Woolworth Building, New York, and affiliated organization, Victor Talking Machine Co., Camden, N. J., have formed R. C. A. Victor Corporation, a new subsidiary, for manufacture, research and sales of radio equipment, talking machines and other equipment heretofore produced by Radio Corporation, General Electric Co., and Westinghouse Electric & Mfg. Co. It is expected to complete new unified operation during next 60 days, with bulk of production to be carried out in future at Camden plant, which will be arranged for increased production. E. E. Shumaker, president of Victor Talking Machine division, will be president of new organization.

Marvel Oil Co., Shubert Building, Philadelphia, has leased three-story building at 2328 Fairmount Avenue, for new oil storage and distributing plant.

Curtis & Brothers Co., Newark, Del., Herbert W. Mason, president, operating a local paper mill, has purchased mill of Mount Holly Paper Co., Mount Holly Springs, Pa., and will take over property at once. Purchasing company has formed Curtis & Brothers Co. of Pennsylvania, Inc., a subsidiary, to operate mill and is planning expansion and complete modernization of plant, including installation

of equipment for production of book papers.

Penn Metal Co., Twenty-fifth and Wharton Streets, Philadelphia, has leased two-story and basement building, 115 x 250 ft., to be erected on Oregon Avenue, to cost about $75,000, exclusive of equipment, and will occupy for expansion.

Crew Levick Co., 219 North Broad Street, Philadelphia, is planning construction of oil storage and distributing plant near Perth Amboy, N. J., to cost more than $90,000 with equipment. A pumping plant will be installed.

Lebanon Steel Foundry Co., Lebanon, Pa., will soon begin superstructure for two-story addition to foundry, 150 x 182 ft., to cost more than $90,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers.

Steel Plate Products Co., Pottstown, Pa., announces a change in sales and purchasing policy effective Nov. 16, when these functions will be resumed by home organization. For some months sales and purchasing have been handled through agency of Plate Fabrications, Inc., with offices in New York and Philadelphia.

Pittsburgh

PITTSBURGH, Nov. 4.—October did not prove to be as good a month as was expected by some machine tool dealers in this district, but business was generally well ahead of the same month last year and there is more than enough inquiry before the trade to assure good showings for the remaining months of the year if it is all acted upon. Just now some buyers are inclined to postpone purchases in some lines, but it is not expected that any projects under active consideration will be entirely abandoned.

The only new inquiry of importance is that of the Pittsburgh Board of Education, which includes a fair-sized list of tools. Both the Westinghouse Electric & Mfg. Co. and the United States Aluminum Co. are placing tools regularly, but other purchases have included only single tools, or at least have been rather small.

Recent large industrial expansion projects which have been announced include improvements at Johnstown plant of Bethlehem Steel Corporation, where $10,000,000 will be spent, and at Etna, Pa., plant of Spang, Chalfant & Co., Inc.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for an eleven-story central engineering laboratory to cost about $350,000 with equipment, and will take bids soon on general contract. Bernard H. Prack, 119 Federal Street, Pittsburgh, is architect and engineer.

Pressed Steel Car Co., McKees Rocks, Pa., is considering a one-story addition, 60x140 ft., to cost about $50,000 with equipment. H. P. Hoffstat is vice-president.

Board of Education, Mount Lebanon, Pa., is considering installation of manual training equipment in new two-story high school to cost about $230,000, for which revised plans are being drawn by Ingham & Boyd, Empire Building, Pittsburgh, architects.

Pillsbury Flour Mills, Inc., Metropolitan Life Building, Minneapolis, Minn., has plans for new paper bag and paper sack manufacturing plant at Wellsburg, W. Va., to cost about $135,000 including machinery.

Chicago, Wilmington & Franklin Coal Co., 332 South Michigan Avenue, Chicago, Ill., will carry out expansion at mines Nos. 5 and 6, near Eccles, W. Va., including installation of new screening and cleaning equipment, conveying and other machinery, to cost more than $150,000.

United States Chain & Forging Co., Union Trust Building, Pittsburgh, has awarded a general contract to Fort Pitt Bridge Works, Inc., Oliver Building, for one-story addition to plant at McKees Rocks, 75x150 ft., for manufacture of automobile bumpers, to cost $45,000 with equipment.

South Atlantic

BALTIMORE, Nov. 4.—Bids will be asked on general contract this month by Levering Brothers, Inc., 200 Key Highway, Baltimore, manufacturer of sash weights and other iron castings, for one and two-story branch plant at Hanover, Pa., to cost about $100,000 with equipment. Part of structure will be used for storage and distribution.

Guilford Folding Box Co., Eager Street and Fallsway, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for new plant on Philadelphia Road, 160 x 205 ft., for manufacture of corrugated and other cardboard boxes and containers, to cost about $175,000 with equipment.

William A. Fingles, Inc., 29 South Howard Street, Baltimore, operating a sheet metal works, has awarded general contract to M. A. Long Co., 10 West Chase Street, for new two-story plant, to cost about $55,000 with equipment.

Rustless Iron Corporation of America, Inc., Loneys Lane and Pennsylvania Railroad, Baltimore, is considering new plant near Pittsburgh, to cost over $100,000 with equipment.

Parkway Motor Co., Inc., 1065 Wisconsin Avenue, N. W., Washington, local representative for Ford automobile, has plans for three-story service, repair and sales building, including body shop, on site recently acquired, to cost over $125,000 including equipment. David Stern, 1412 I Street, N. W., is architect.

Safe Harbor Water Power Corporation, a subsidiary of Pennsylvania Water & Power Co., Lexington Building, Baltimore, has awarded a general contract to Arundel Corporation, Knickerbocker Building, for power dam and power house for hydroelectric power project at Safe Harbor on Susquehanna River, to cost about $30,000,000 with steel tower transmission lines. Engineering design and purchase of equipment will be handled by company engineering department.

Simmons Co., Kenosha, Wis., manufacturer of metal bedsteads, springs, etc., has purchased plant and business of B. F. Huncley Furniture Co., Winston-Salem, N. C., and its subsidiary manufacturing interests. New owner will continue operation at present location and plans expansion program.

Mexican Petroleum Corporation of Georgia, Inc., Savannah, a subsidiary of Pan-American Petroleum & Transport Co., 122 East Forty-second Street, New York, has taken over a local 50-acre tract as site for a new refinery, with storage and distributing facilities, to cost about $850,000 with equipment. Superstructure for group of one-story units will soon be placed under way. A. M. McKeen is chief engineer, in charge.

American Loom Co., Greenville, S. C., recently formed with capital of $50,000 to manufacture textile machinery and equipment, plans early operation of local factory to cost about $40,000 with equipment. F. A. Lawton, 620 East McBee Avenue, Greenville, is president.

United Railways & Electric Co., Continental Building, Baltimore, will take bids early next year for one and two-story automobile service, repair and garage building for bus maintenance division, to cost about $250,000 with equipment. W. H. Emery, 18 East Lexington Street, is architect.

St. Louis

ST. LOUIS, Nov. 4.—Herman Body Co., Clayton and Newstead Avenues, St. Louis, manufacturer of automobile bodies, has awarded general contract to Murch Brothers Construction Co., Railway Exchange Building, for one-story plant, 130 x 160 ft., to cost about $40,000 with equipment.

Kansas Gas & Electric Co., Market Street, Wichita, Kan., has plans for one-story equipment storage and distributing plant, with general service, mechanical repair and other departments, to cost more than $300,000 with equipment. C. V. Waddington, Sedgwick Building, is engineer.

J. A. Werme Iron & Steel Co., North Indiana Street, Oklahoma City, Okla., will build a one-story addition, 100 x 300 ft., for storage and distribution, to cost about $30,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, is considering new engine house at Northern Kansas central branch division shops at Atchison, Kan., with machine and repair facilities, to cost about $140,000 with equipment. E. A. Hadley is chief engineer.

Missouri Valley Farmers' Association, Virginia Building, Columbia, Mo., has plans for three-story feed mill, with elevator, including screening, conveying and other mechanical equipment at Springfield, Mo., where site has recently been purchased, to cost about $100,000 with equipment. Southwestern Engineering Co., McDaniel Building, Springfield, is engineer.

Iowa-Nebraska Light & Power Co., Ninth and L Streets, Lincoln, Neb., has plans for new one-story steam-operated electric generating plant, to cost about $120,000, of which close to $80,000 will be used for equipment. Engineering department of company at Davenport, Iowa, is in charge.

North American Air Lines, Inc., Hunt Building, Tulsa, Okla., has secured 100-acre tract at Sapulpa, Okla., and plans airport with hangars, repair shop and other mechanical units, to cost more than $90,000 with equipment. W. L. Ives, Tulsa, is head.

Clay & Bailey Mfg. Co., Kansas City, Mo., and its subsidiary, Morgan Foundry Co., have purchased a 3½-acre site, between Gould Avenue and Frisco right-of-way for new plant. An existing building will house foundry, and a machine shop, warehouse and a cleaning room will be erected.

Chicago

CHICAGO, Nov. 4.—Sales of machine tools are steady to miscellaneous buyers. It is only the occasional purchaser who is interested in more than one piece of shop equipment. The Santa Fe will buy a 24-in. drill. The International Harvester Co. is shaping programs for several of its plants, but at present is taking only a few of its needs for its Farmall plant at Rock Island, Ill. A number of users in Milwaukee are in the market for individual tools. The Allis-Chalmers Mfg. Co., with tractor plants at Milwaukee and Springfield, Ill., has announced expansion programs and the trade is looking forward to lists from this source. It is stated that orders received by machine tool manufacturers closely match production schedules and as a result deliveries have not improved.

Fargo Foundry Co., Fargo, N. D., has started erection of two additions, 45x77 ft. and 35x37 ft., for fabrication of structural steel and tank work.

Hardinge Brothers, Inc., 4149 East Ravenswood Ave., Chicago, manufacturer of oil burners and oil burning equipment, has plans for a four-story addition, to cost more than $90,000 with equipment. Paul McGrath, 38 South Dearborn Street, is architect.

Robert Zwick, 1247 Blue Island Avenue, Chicago, manufacturer of plumbing equipment and supplies, has awarded general contract to M. L. Bein, 100 North LaSalle Street, for two-story plant, 120x125 ft. to cost about $55,000 with equipment.

Ostrander-Seymour Co., 1900 South Fifty-fourth Avenue, Cicero, Ill., manufacturer of photo-engraving machinery and equipment, has purchased adjoining site for a one-story addition, 50x270 ft., to cost about $60,000 with equipment. George P. Cullen, Inc., 2940 West Lake Avenue, is engineer and contractor.

Board of Education, Proviso Township High School District No. 209, 124 South Seventeenth Street, Maywood, Ill., is considering installation of manual training equipment in three-story addition to local high school to cost $1,000,000, for which bids are being asked on general contract. J. C. Llewellyn & Son, 38 South Dearborn Street, Chicago, are architects.

Department of Public Works, City Hall, St. Paul, Minn., will begin superstructure at once for an equipment storage and distributing plant, with mechanical and electrical repair departments, to cost about $200,000 with equipment. Harry S. Bronson, City Hall, is acting city architect.

Board of Works, Fort Dodge, Iowa, has approved plans for a one-story machine and repair shop for municipal waterworks department, to cost about $30,000 with equipment.

Merit Hardware Mfg. Co., 2125 West Rice Street, Chicago, manufacturer of casket hardware, etc., is contemplating three-story plant unit, to cost over $250,000 with equipment.

Northern Malleable Iron Co., Forest and Wells Street, St. Paul, Minn., has awarded a general contract to Romer Construction Co., 190 Ramsey Street, for a one-story addition.

Gears & Forgings, Inc., 1001 West Washington Boulevard, Chicago, has acquired a plant at 2108-20 North Natchez Avenue, for expansion, and will concentrate all local production at new location.

Indiana Limestone Co., Tribune Tower Chicago, states that report published in THE IRON AGE of Oct. 10, that it has organized Texas Quarries, Inc., was incorrect. Operations of Indiana Limestone Co. are confined to Monroe and Lawrence counties, Indiana.

Manco Mfg. Co., Bradley, Ill., manufacturer of wood-working machinery and hardware, is enlarging its plant at a cost of about $25,000 and is installing heating and ventilating equipment and new machinery. A new building will give about 10,000 sq. ft. of additional floor space.

Indiana

INDIANAPOLIS, Nov. 4.—Contract has been let by United States Radio & Television Co., 1340 South Michigan Avenue, Chicago, to Bowman Construction Co., Marion, for one-story engineering building, 115 x 125 ft., at Marion, part of structure to be used for administration purposes, to cost $60,000 with equipment.

Auburn Automobile Co., Auburn, has plans for two-story addition, to be used in part for storage and distribution, to cost $70,000 with equipment. A. M. Strauss, Cal-Wayne Building, Fort Wayne, is architect.

Utah Radio Products Co., 1615 South Michigan Boulevard, Chicago, manufacturer of radio equipment and parts, has acquired Caswell-Runyan Co., Huntington, manufacturer of kindred apparatus, and will consolidate. Plant will be continued at Huntington and expansion in output is planned. Purchasing company has also acquired Carter Radio Co., 300 South Racine Avenue, Chicago, and will merge with organization. Utah company has authorized increase in capital stock from 250,000 to 1,000,000 shares, part of proceeds to be used for acquisitions noted and expansion.

Hoosier Desk Co., Jasper, Ind., has awarded general contract to Carl Keller, 818 DuBois Street, for three additions, consisting of two production units, 60 x 85 ft., and 23 x 35 ft., and one-story power plant, 48 x 60 ft., to cost over $85,000 with equipment. Thole & Legeman, American Trust Building, Evansville, are architects. S. G. Norman is general manager.

Fire King Stoker Co., 1159 Roosevelt Avenue, Indianapolis, is considering one-story assembling plant addition, to cost about $100,000 including equipment.

Cincinnati

CINCINNATI, Nov. 4.—As a result of the spurt in fresh bookings of machine tool manufacturers and a steady demand the latter part of the month, the October volume of business was a trifle ahead of that of September. In fact, one leading manufacturer of lathes indicates that October will rate as one of the best months this year. Production continues at the high rate that has prevailed for the last six months, district manufacturers still having heavy backlogs. Inquiry has slackened somewhat the past week.

Plans have been filed by Burkett Closed Body Co., 541 Master Avenue, Dayton, Ohio, manufacturer of automobile bodies, for extensions and improvements in three-story factory, to cost about $25,000.

State Department, Columbus, Ohio, has plans for one-story and basement power plant, to cost over $200,000 with equipment. T. R. Ridley, Ohio Hartman Building, is architect, in charge.

Board of Education, Marion, Ohio, is contemplating installation of manual training equipment in new junior high school in Oakland Heights section to cost more than $250,000, for which bids will be asked on general contract this month. Garber & Woodward, 4 West Seventh Street, Cincinnati, are architects.

Dayton Power & Light Co., Dayton, Ohio, has filed plans for addition to steam-operated electric generating plant, to cost about $200,000 with equipment. Company is a subsidiary of Columbia Gas & Electric Co., Cincinnati, and engineering department of latter organization is in charge.

Tennessee Cereal Co., Franklin, Tenn., plans installation of electrically-operated drying equipment, conveying machinery, steam cookers, roller mills and other equipment in new one-story plant, 100x 200 ft., to cost about $100,000 with machinery. B. W. Ernst is president.

Pennsylvania-Dixie Cement Corporation, Kingsport, Tenn., is contemplating an expansion at local mill, including installation of machinery for wet process operation, to cost upward of $100,000. Headquarters of southern division are at Chattanooga, Tenn. W. H. Klein is general manager.

Frigidaire Corporation, Taylor Street, Dayton, Ohio, a subsidiary of General Motors Corporation, has awarded general contract to T. E. Patterson, Dayton, for one-story addition, 78x127 ft., and improvements in present plant, to cost about $40,000 with equipment.

Detroit

DETROIT, Nov. 4.—Plans are under way by McCord Radiator & Mfg. Co., 2587 East Grand Boulevard, Detroit, manufacturer of automobile radiators, etc., for a one-story top addition to present three-story plant, to cost about $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Fitzjohn Mfg. Co., Muskegon, Mich., manufacturer of commercial automobile bodies, is planning a one-story addition, totaling 20,000 sq. ft. floor space, to cost about $55,000 with equipment.

Detroit Transfer Co., 1720 Twelfth Street, Detroit, has plans for a two-story automobile service, repair and garage building, 110 x 200 ft., for motor trucks and passenger cars, to cost about $120,000 with equipment.

Otis Steel Co., Jennings Road, Cleveland, is considering one and two-story factory branch at Detroit, for storage and distribution, to cost more than $65,000 with mechanical handling equipment.

Sheet Aluminum Corporation and affiliated organization, Hybinette Patents Corporation, Jackson, Mich., have acquired a local building and will remodel for early occupancy by last noted company as a metallurgical and experimental laboratory for work in aluminum alloys and other metals.

American Enameled Wire Co., Water Street, Muskegon, Mich. is said to be planning one-story addition to cost in excess of $45,000 with equipment. A. R. Thornton is manager.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has begun con-

struction of a lubricating oil unit at Avery Avenue and Grand Trunk Railroad. A sign manufacturing plant, as well as storage and distributing plant will be built at Charles and Mount Elliott Avenues. Entire program will cost more than $100,000 with equipment.

United States Aluminum Co., 3311 Dunn Road, Detroit, has plans for one-story unit, 100 x 375 ft., to manufacture aluminum parts, etc., to cost about $80,000 with equipment.

Standard Steel Shelving Co., recently organized to manufacture steel shelving, is now in operation at its plant, 1326 Woodridge Avenue, Detroit.

A C Spark Plug Co., Flint, Mich., is planning a three-story addition, to cost about $100,000.

Milwaukee

MILWAUKEE, Nov. 4.—Sales of machine tools in October were a little less than in August, but equal to those in September. Some dealers report a slight recession toward the end of the month, but machine tool manufacturers have not experienced much falling-off in orders, with more business coming from the East than from this territory. Production of large automobiles has dropped considerably, but the manufacture of small and medium sized cars, while much below last year's high mark, is nevertheless fair.

Milwaukee Gray Iron Foundry Co., Thirty-ninth Avenue, Milwaukee, has begun work on one-story cleaning room, 35 x 130 ft., and core oven building, 25 x 40 ft.

Royal Airways Corporation, 614 East Gorham Street, Madison, Wis., is building a hangar, 100 x 135 ft., including machine and service shop. Flad & Moulton, Madison, are architects.

Wisconsin Cylinder Co., 1308 Eighteenth Street, Racine, Wis., manufacturer of motor blocks, is erecting two shop additions, 40 x 70 ft. and 28 x 60 ft.

Beloit Iron Works, 815 Second Street, Beloit, Wis., manufacturer of paper mill machinery and equipment, has begun work on one-story addition, to cost about $35,000.

Kiel Furniture Co., Milwaukee and Kiel, Wis., will build a three-story addition to factory at Kiel, 66 x 102 ft. J. B. Laun is in charge; Van Ryn & De Gelleke, 114 Wisconsin Avenue, Milwaukee, are architects.

Lakeside Malleable Casting Co., 23rd and Clark Streets, Racine, Wis., has begun work on one-story addition to its foundry, 60 x 80 ft., costing about $10,000 and one-story pattern storage vault, 40 x 60 ft.

Gulf States

BIRMINGHAM, Nov. 4.—Plans have been approved by Nichols Copper Co., 25 Broadway, New York, for one-story power plant at new refinery at El Paso, Tex., to cost about $100,000 with equipment.

Certain-teed Products Corporation, 100 East Forty-second Street, New York, is considering one-story addition to wallboard mill at Agatite, Tex., to cost more than $100,000 with equipment.

Hughes Tool Co., 300 Hughes Street, Houston, Tex., manufacturer of oil well tools and equipment, has taken out a permit for one-story addition, 35 x 180 ft., to cost about $50,000 with equipment.

Jacob E. Salie, Empire Building, Birmingham, architect, has plans for two-story automobile service, repair and garage building, 140 x 150 ft., to cost about $100,000 with equipment.

Day Mfg. Co., Sherman, Tex., manufacturer of corrugated paper boxes and containers, has leased one-story building to be erected at South Crockett and West Jones Streets, 65 x 145 ft., for new plant, to cost about $45,000 with machinery. Clyce & Rolfe, Sherman, are architects.

Universal Metal Mfg. Co., Tarrant, Ala., has awarded general contract to Price & Belcher, 2904 North Twenty-seventh Street, for one-story addition, 75 x 125 ft., to cost about $28,000 with equipment. Charles H. McCauley, Jackson Building, Birmingham, is architect.

J. N. McDonald, 714 First Bank & Trust Co. Building, Sarasota, Fla., and associates have secured permission to use water from Oklawaha River in Putnam and Marion Counties for hydroelectric power development, for which plans will be prepared by George L. Pratt, Citizens' & Southern Bank Building, Atlanta, Ga., engineer. Station will have capacity of about 15,000 hp., and will cost more than $900,000 with transmission system.

Board of Education, Texarkana, Tex., is considering installation of manual training equipment in new high school, to cost about $150,000 with equipment. Witt, Seibert & Halsey, Texarkana, are architects.

Cleveland

CLEVELAND, Nov. 4.—The spurt of buying that followed the National Machine Tool Exposition appears to have spent itself. At least sales declined the past week. However, with a good volume of business during part of the month, October sales showed some gain over September. Orders placed during the week were for single machines and were well distributed throughout various industries. Virtually no buying is being done by the automotive industry and very little business is expected from that source during the remainder of the year.

The Nickel Plate Railroad has purchased a 6-ft. radial drill. While some other railroad business is in prospect, it is not expected that it will be placed in the immediate future.

E. T. Pierce Co., 4903 Harlem Avenue, Cleveland, manufacturer of tools, dies, etc., has awarded general contract to Ray P. Adams, 975 Roanoke Road, for one-story plant, 65 x 100 ft., to cost about $45,000 with equipment. George A. Ebeling, 737 Prospect Avenue, is architect.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment, has plans for an addition, to cost $1,000,000 with equipment. Company also has plans for new branch plant at Sarnia, Ont., to cost about $3,000,000 with machinery. Fred A. Hahn, Gardner Building, is architect. C. O. Miniger is president.

Wheeler Metal Products Co., 1637 Collamere Road, Cleveland, has plans for one-story factory, 80 x 300 ft., to cost about $140,000 with equipment. Austin Co. is engineer.

Sinclair Auto Service Corporation, 2540 West Twenty-second Street, Chicago, M. J. Kirby, head, has plans for a one-story mechanical and repair shop at Cleveland, to cost about $85,000 with equipment. Shattuck & Layer, 134 North LaSalle Street, Chicago, are architects.

Tuscan Tire & Rubber Co., Carrollton, Ohio, is considering early rebuilding of plant destroyed by fire Oct. 29.

Acme Refining Co., 3591 West Fifty-sixth Street, Cleveland, manufacturer of greases, lubricants, etc., has plans for two-story addition, to cost about $150,000 including equipment.

Cleveland Heights Air Terminals, Inc., 1060 Quilliams Road, Cleveland, has plans for airport on Ridgebury Boulevard, comprising hangars, repair and reconditioning facilities, oil storage and other mechanical units, to cost more than $125,000 with equipment. James R. Gloyd, care of A. M. Allen Co., Marshall Building, is engineer.

Youngstown Steel Car Door Co. has transferred manufacturing operations from Cleveland to a new plant at Wickliffe, Ohio. Its product has heretofore been fabricated by Midland Steel Products Co. Officials advise that company has enough unfilled tonnage t ooperate at a capacity until next March.

Pacific Coast

SAN FRANCISCO, Oct. 31.—Heintz & Kaufman, Inc., 219 Natoma Street, San Francisco, manufacturer of radio equipment, etc., has awarded contract to Barrett & Hilp, 918 Harrison Street, for four one-story plant units at South San Francisco, to be used primarily for experimental work, to cost $70,000 with equipment. Company has a 6-acre site at location noted, and is said to be planning other units later. E. A. Neumarkel, 544 Market Street, is architect.

Western Pipe & Steel Co., 5717 Santa Fe Avenue, Los Angeles, is planning one-story addition, 130 x 345 ft., for forge and heavy plate shop, to cost about $50,000 with equipment.

Truscon Steel Co., Los Angeles, is planning one-story addition, 60 x 150 ft., to storage and distributing plant, to cost about $35,000. Headquarters are at Youngstown, Ohio.

Imperial Irrigation District, El Centro, Cal., is arranging an early election to vote bonds for $2,000,000, proceeds to be used for a new Diesel engine type electric generating plant in Imperial Valley district, including transmission lines, for which plans will soon be drawn by engineering department.

Rainier Pulp & Paper Co., Shelton, Wash., is planning an expansion program, with installation of additional equipment, to cost over $400,000. Main offices are at 354 Battery Street, San Francisco.

Little Pittsburgh Mining Co., Wallace, Idaho, Herman J. Rossi, in charge, is planning installation of new flotation mill, to cost more than $850,000 with machinery.

Overhead Door Co. of California, Inc., 1410 Madison Street, Oakland, Cal., manufacturer of metal garage doors, etc., has plans for a one-story plant to cost about $35,000 with equipment. G. L. Brown, American Bank Building, is architect.

Technical Glass Co., Vernon, near Los Angeles, has awarded a general contract to R. G. Brownell, 2528 East Slauson Avenue, for a one-story plant, 40 x 110 ft., at Vernon, to cost about $25,000 with equipment. H. W. Charlton, 2528 East Slauson Avenue, is architect.

Foreign

ERECTION of a cane sugar refinery has been authorized by Redo Sugar Co., Los Mochis, Mexico, at local properties, to cost over $200,000 with machinery.

Graham-Paige International Corporation, Paris, France, a subsidiary of Graham-Paige Co., Detroit, manufacturer of automobiles and motor trucks, is arranging for establishment of European headquarters at Antwerp, Belgium, under name of Société Anonyme Graham-Paige Belgique. Plans are under way for factory branch and parts plant at Antwerp, including storage and distributing facilities, to cost over $100,000.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, subsidiary of American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, has work under way on a new plant near Berlin, Germany, to manufacture brass goods and enameled ware, to cost more than $200,000 with machinery. It is expected to be ready for service early next year. Plant will supplement another works now being completed on adjoining site for manufacture of sanitary ware products.

H. V. McKay Pty., Ltd., Melbourne, Australia, manufacturer of a new type reaping and threshing machine, is arranging for early construction of new plant at Waterloo, Ont., in cooperation with Waterloo Mfg. Co., manufacturer of agricultural equipment, for exclusive production of new equipment, including parts and assembling departments, reported to cost more than $700,000 with machinery. It is proposed to organize a new company with capital of $2,500,000 to carry out project, to be controlled jointly by two organizations noted.

Canada

TORONTO, Nov. 4.—Machine tool sales have been slowing up the past week or ten days. Prospective demand, however, appears bright and local distributers and builders look upon this as but a temporary lull. Inquiries for new works are in good number, but the majority calls for single tools. The automotive industry is holding its purchases close to actual replacement needs and buying from this source is somewhat limited.

In Manitoba, Saskatchewan and Alberta, the recent expansion of domestic manufacturing has created a steadily increasing demand for industrial machinery. While machine tools are not so prominent in the sales lists to these provinces, mining equipment, pulp and paper mill and road building machinery have been quite active. One feature of the business in the West is that the greater part of the equipment is imported from the United States.

Plans are being prepared for a $2,000,000 linoleum manufacturing plant at Farnham, Que., for Barry, Ostlere & Shepherd, Ltd., Kirkcaldy, Scotland. J. M. Robertson, 1140 St. Catharine Street, Montreal, is consulting engineer. Work will start early in 1930.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, has started work on additions to its plants at Sandwich, Ont., which will represent an expenditure of $175,000.

Mill and equipment at Dome Mines, Ltd., South Porcupine, Ont., were recently destroyed by fire with a loss estimated at $750,000. It is planned to rebuild at once, at a cost of about $1,000,000.

Western Bridge Co., is planning to build an addition to its plant at Vancouver, B. C., to cost over $500,000. Company is affiliated with Hamilton Bridge Co., Hamilton, Ont., which recently acquired Coughlan Steel Plant, Columbia Street, Vancouver.

Western Mfg. Co., Regina, Sask., contemplates building a one-story addition, 64 x 173 ft., to cost $300,000.

United Mfg. Co., Cap de la Madeline, Que., has awarded contract to Charles Page Construction Co., Three Rivers, Que., for a three-story factory to cost $60,000, to be completed by Dec. 15.

Superior Alloys, Ltd., Hudson and Portage Streets, Sault Ste. Marie, Ont., has awarded additional contracts for a steel plant to cost $75,000

International Nickel Co., Port Colborne, Ont., is preparing to start work on an addition and has awarded steel contract to Standard Steel Construction Co., Welland, Ont.

International Harvester Co., Burlington Street East, Hamilton, Ont., has awarded contract to Humphrey Brothers, 214 Burlington Street East, for a one-story factory addition.

B. H. & Fred Prack, Pigott Building, Hamilton, Ont., have plans for a four-story addition to plant of B. Greening Wire Co., Hamilton.

New Trade Publications

Rotary Displacement Meters.—Connersville Blower Co., Connersville, Ind. Bulletin No. 305 illustrates different installations of Connersville rotary displacement meters for the measurement of gas. The fact is pointed out that the product is readily adaptable to unusual as well as ordinary requirements.

Lamp Hangers.—Thompson Electric Co., Cleveland. A 32-page catalog describing Thompson safety-lowering hangers and accessories, including the new lamp shock absorbers. Profusely illustrated and discusses such subjects as the design, construction and operation of hangers, dimensions and screw-hole specifications, spare-parts schedule, installing and wiring, electrical characteristics and mechanical load. A table of contents is given for easy reference.

Mine and Industrial Safety.—Mine Safety Appliances Co., Pittsburgh. No. 4 general catalog, consisting of 160 illustrated pages, many of them in color, describes the mine and general safety equipment manufactured by the company. Among the products are Edison electric safety cap lamps and accessories, permissible shot firing devices, Wolf flame safety lamps, gas and air measuring devices, rock dusting equipment, oxygen breathing apparatus, safety clothing, eye and head protective equipment and a complete line of first aid supplies. A classified index is published in the front of the catalog.

Steel Floor Grating.—Walter Bates Steel Corporation, Gary, Ind. In a 12-page folder the company sets forth information about its steel floor grating. The two pages in the center are given over to a table of safe loads and deflections for main bar grating.

Lock Washers.—Shakeproof Lock Washer Co., Chicago. Several practical applications of the Shakeproof principle of locking are shown in a four-page folder.

Blast Furnace Brick Lining.—North American Refractories Co., Cleveland. A folder describing a new world's record for production per brick in blast furnace service set at furnace No. 1 of the American Rolling Mill Co., Ashland, Ky. Ashland steam-pressed blast furnace brick, a product of the company, was used as lining for the furnace.

Armco Ingot Iron.—American Rolling Mill Co., Middletown, Ohio. The third architectural rotogravure issued by this company is a pictorial review of numerous buildings throughout the country in which Armco ingot iron has been used.

Conveyor Equipment.—Saginaw Stamping & Tool Co., Saginaw, Mich. Bulletin on conveyor equipment covering in detail a new belt conveyor idler design, an all-steel unit, fully rust-proofed to meet severe weather conditions. Bulletin also covers all of the customary types of overhead conveyor trolleys, trolley wheels, roller turns and chain hoist trolleys, with illustrations.

Precision Instruments.—Gaertner Scientific Corporation, 1201 Wrightwood Avenue, Chicago. Catalog M-130, 80 pages. Reading and micrometer microscopes, including workshop and inspectors types; spherometers, levels; laboratory reading telescopes; and reading scales are described and illustrated. Sections are devoted to Cathetometers, comparators and dividing machines for both linear and circular graduations. Standard meters and scales are also shown.

Milling Machines.—Ingersoll Milling Machine Co., Rockford, Ill. Folder of four pages, illustrated, and describing two types of milling machines and a cutter grinder, all of which were exhibited at the Cleveland Machine Tool Builders' Exposition.

Steam Pressures for Industrial Plants.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Pamphlet of eight pages consisting of a paper by W. A. Shoudy on determination of steam pressures for industrial plants. This has been reprinted from *Combustion*, August issue.

Extruded Shapes.—Taunton-New Bedford Copper Co., Taunton, Mass. A four-page leaflet, illustrated, discusses the company's 'Eagle Brand' of extruded shapes and recommends that "if it cannot be stamped or pressed, consider an extruded shape."

Heat Resisting Alloys.—Driver-Harris Co., Harrison, N. J. An attractive booklet of some 28 pages has been issued by this company. There are 13 reproductions of photographs with appropriate captions showing various

installations of Nichrome castings for use by a number of American companies.

Drilling and Centering Machines.—Sundstrand Machine Tool Co., Rockford, Ill. Leaflet describing single and double-end drilling and centering machines.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee. A four-page illustrated leaflet discusses "Fewer Dollars; Lower Inventories; Sivyer Castings." Data for the physical properties of a heavy drive pinion of chrome alloy steel are given.

Corrosion-Resistant Alloys.—International Nickel Co., New York. In a 16-page pamphlet entitled "Meeting the Metal Requirements of the Process Industries," corrosion data are given for a number of corrosion-resistant alloys into which nickel enters and the varied equipment into which they are incorporated. These are shown by illustrations and there is also a table giving known and established users of monel and nickel to overcome corrosive action.

Welding Rod for 18-8 Steels.—Fusion Welding Corporation, Chicago. Bulletin No. 4 gives physical characteristics of welding rod suitable for joints in high chromium-nickel steels, and welding technique is described.

Condulets, Groundulets, etc.—Crouse-Hinds Co., Syracuse, N. Y. Bound Catalog 2200 of 280 pages illustrates and describes a variety of condulets, groundulets and plugs and receptacles. This supersedes all previous listings. It is cross indexed and covers a great variety of items.

Gears.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Folder 5223, containing pertinent facts about heat-treated gears and their use. Full description of BP, "tough-hard" and the EP processes, created and used in heat treating Westinghouse-Nuttall gears is included.

Water-Wheel Electric Generating Unit.—James Leffel & Co., Springfield, Ohio. Bulletin W207 illustrating and describing briefly a new self-contained water-wheel electric generating unit.

Rotary Positive Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin 123 of 8 pages illustrating and describing the RSB and RBB series of rotary positive blowers. Principal features are the Boston type arrangement with double outer bearing supporting both shafts, use of renewable split-sleeve babbitt lined bearings or of anti-friction bearings. Tables of capacity and pressure ratings are given.

Self-Priming Centrifugal Pumps.—Duriron Co., Dayton, Ohio. Bulletin 155 of 4 pages illustrates and describes a series of Duriron centrifugal pumps with direct motor drive. Details concerning individual parts are covered.

Footlift Truck.—Lewis-Shepard Co., Watertown, Mass. Four-page folder No. 100 illustrating and describing a new lift truck constructed to operate by foot for loads up to 3500 lb. It is made in several sizes, weighing from 228 to 307 lb.

Jacklifts and Stackers.—Lewis-Shepard Co., Watertown, Mass. Four-page circular No. 57 illustrating and describing the Jack-Stack-Rack system for stacking many materials, including small castings and other parts, in bins.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

SECURITIES were sold in such unprecedented volume that the New York Stock Exchange closed two days to enable brokers to straighten out their books. As a measure of the deciine, the quotational value of 240 leading issues lost more in September and October than all their gains since January first. Banks were forced to assume two billions of loans called by out-of-town banks and others, even though the grand total of brokers loans was reduced a billion.

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INSOLVENCIES show no unusual increase in number. Prominent among them are the Foshay companies of Minneapolis, which control a number of minor public utilities, and a Chicago bank which tied up its funds in a large building project.

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MONEY continues at an easy rate. Federal Reserve rate to member banks was reduced from 6 to 5 per cent; Bank of England also dropped its rate ½ per cent.

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RETAIL trade is considered fair—about equal to the same week in 1928—but reduced somewhat from the preceding week. The general level of wholesale prices is slowly decreasing; wholesale business generally is hesitant, commitments being deferred until the effect of the stock market's fluctuation can be appraised. Stocks of manufactured goods are reported slightly smaller than a month ago, but raw materials on hand are much larger.

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COMMODITY prices have dropped steadily since July, Fisher's index then being 98.6, now 93.7. Wheat prices rebounded rapidly on active foreign buying, and on the absorption of most of the Argentine crop. . . . Brazilian business is acutely depressed in sympathy with coffee prices—the lowest since 1923. Proposals for a moratorium or a currency issue were rejected by the Government, which is advising orderly liquidation of accumulated stocks.

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TEXTILES, especially cotton, have been overproducing, said Lincoln Baylies, president New England Mill Men's Association. Spindles made nearly as much in last eight months as during entire record-breaking year of 1927; insufficient demand has depressed prices of cotton cloth and reduced the mill margin by 5c. in two years. . . . Wool is quiet, but prices are steady. . . . Full-fashioned hosiery, reflecting the influence of short skirts, increased two-thirds in value since 1925, and the number of mills from 92 to 235. . . . A survey of New England industries shows that the losses in textiles and shoes have been counterbalanced by increasing manufacture of tools, typewriters, bicycles and tableware.

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FORD MOTOR CO. reduced prices on all models an average of $30. . . . Exports of automotive products in September amounted to $35,000,000, about the same as 1928. . . . Responsive to the slump in automobile production, the plate glass industry is curtailing, although business in mirrors, window glass and wire glass continues in good volume and at higher prices. . . . All organized surface transit is decreasing in New York; even the busses are carrying 8 per cent fewer passengers than last year, they riding in subways, taxicabs and private cars. . . . Approval was given to the final link in the super-highway leading from the Hudson river tunnels across New Jersey to Camden, in the form of a $19,000,000 bridge and viaduct across the Hackensack meadows.

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MORTGAGES on small homes in Philadelphia have been foreclosed in such a number that the Real Estate Board has requested all trust companies to extend due dates six months. . . . A trust fund of $10,000,000 has been bequeathed by T. E. Mitten to foster the cooperation between capital and labor, as exemplified by his management of the Philadelphia traction system. . . . Western Union increases the wages of minor employees a total of $2,000,000, according to a merit system judged by a joint committee of officials and employees. . . . Actuaries have worked out a pension plan for Westinghouse Electric & Mfg. Co., which will cost 1.2 per cent of the payroll and be administered by an independent trust company. . . . A. I. du Pont has instituted a pension system to meet the urgent needs of the aged in Delaware.

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MILLION-DOLLAR or more yearly incomes were enjoyed by 290 Americans in 1927; this bracket of income returns has steadily increased since 1921, when there were 21 such persons. Total net incomes reported in 1927 was about equal to 1926; taxable corporation returns numbered the same, but the total of net earnings was off 7 per cent to nine billion.

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CONSOLIDATIONS reported were Butler Brothers of Chicago with American Wholesale Corporation of Baltimore (combined mail order sales $100,000,000); and Stephen Sanford & Sons with Bigelow-Hartford Carpet Co. (combined annual sales $35,000,000).

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PROHIBITION was abandoned by Nova Scotia, the last but one of Canadian provinces to adopt the plan of bulk sales of liquor in Government stores.